AMERICAN DYESTUFF REPORTER

"Circulated Everywhere Dyestuffs Are Used"

Devoted to the Practical Application of Dyestuffs and the Mechanical Equipment Incidental Thereto

Vol. X NEW YORK, JANUARY 16, 1922 Number 2

Practical Science of Kier Boiling

A Brief Survey of the Results Obtained by Twenty-five Years of Research and Experimentation to Simplify the Operation of Kier Boiling, Reduce Fuel Costs and Produce a Uniformly High Standard of Work

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IT is the intention of this article so to deal with the advance in the art of kier boiling that those who are charged with the responsibility for the operation may know of the intensive research work which has been done to assist them. Questions of quality and costs, both in investment and in operating, must receive careful attention, so that the best of fabrics may be marketed at the right price.

Those upon whom is placed the responsibility for the operation of kiers realize that cotton yarns or fabrics must leave the kier room in the proper condition. No amount of subsequent treatment can make up for the fact that goods did not start right. The objective which must always be kept in mind has three main heads; each head is very important:

1. Quality of work performed by kier.
2. Cost of producing high-quality work.
3. Uniformity of both quality and cost.

The quality of work done must be kept as high as possible, and this head is the one of prime importance. A discussion with almost any old bleacher who has had years of experience will bring out the opinion that the quality of work done by the original style center vomit kiers cannot be bettered; and, indeed, these old bleachers are almost correct. The quality was there, and uniformity was there (depending upon the human element); but economy, the magic word to-day, was absent. As a matter of fact, the records show a 5-ton kier of the center vomit type which consumes over 2 tons of coal for a single boil. Few could afford this to-day.

Results Produced by Center Vomit Kier

That type of circulation, however, gave an almost ideal kier condition. The liquor would percolate through the goods and gather in the space below the grates until the steam generated pressure enough to vomit a fairly definite amount of liquor through a pipe in the center of the kier over the top of the goods. This operation would be repeated approximately forty to forty-eight times per hour with reasonable regularity, provided steam pressure remained constant. Steam would blow to atmosphere during the period between one throw, or vomit, and the time when the percolating liquor resealed the bottom opening to the center pipe.

This intermittent throw of liquor allowed an even penetration of each and every fiber in the kier, and, in fact, practically forced a penetration, due to the inherent action of the kier; that is, emptying the space below the grates and throwing that volume of liquor on top of the goods. During the periods of rest the liquor would start an even passage, and the tendency to channel—that is, for liquor to find an easy passage through the goods—was decreased.

Extensive and careful study of the proper boiling of kiers involving many experiments and trials, and at the cost of much money, has extended over a period of more than twenty-five years.

Increasing Demands of Progress

Circulation control by means of the liquor in a container operating a valve when a certain amount of liquor had entered was tried, injectors were tried, pumps and other devices were tried; but all were found to be below the plane of the desired requirements. As years passed, another element had to be considered; namely, duration of boil. No longer could unlimited hours be allowed for

an operation. The problem had also been further complicated by the size and variety of kiers, and the variety of goods to be boiled. Kiers now range from little ones holding less than a ton to large ones which may be 10 feet in diameter and 10 feet or more in depth, and holding as much as 5 to 5½ tons of dry goods. These kiers may be either of metal or wood, and open or closed. The open kiers are operated at approximately 190 deg. Fahr., while certain pressure kiers are operated at 30 pounds pressure, which is equivalent to 275 deg. Fahr. The types of goods boiled to-day now cover a much wider range. Raw stock, gauze for absorbent cotton and bandages, organdies with 200,000 yards in a kier, up through knit goods, threads, dress goods, sheetings and coutils, must all be boiled.

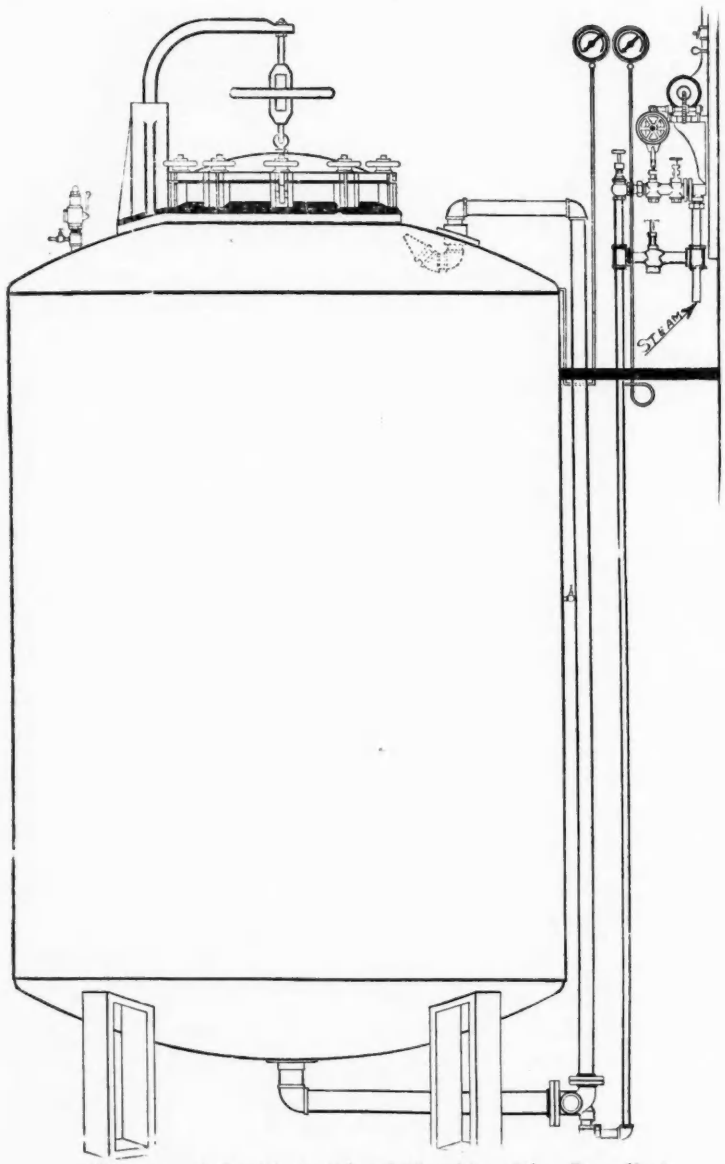

Diagram of Positively Timed Vomiting Kier Described in Accompanying Article

Then, too, a few years ago only the best cotton fiber was considered worth spinning and weaving; mutton tallow and potato starch were used almost exclusively for sizing, and kier chemicals were carefully selected. This, therefore, insured perfect saponification and removal of all substances, except cellulose. To-day, low-grade cotton, and even waste products, is spun and woven. Almost invariably mineral oil sizes have been substituted and mineral oils, cornstarch and cottonseed oil heated in a kier with caustic form apparatine similar to paraffine. This combination, instead of being soluble, tends to form a coating on the surface of the cotton fiber, thus retarding the circulation during the early part of the boil. All these problems have been solved, and with proper equipment are being overcome. Constant study and research, with the gradual elimination of complications and the cutting out of undesirable extra equipment, has finally developed a remarkably simple system of kier boiling, which has had an extremely favorable influence on the three objectives heretofore mentioned.

Human Factor Replaced by Mechanism

By making the apparatus simple, the time and effort of kier attendants have been saved and maintenance costs decreased. The human element in kier boiling has been removed and replaced by a mechanism which will absolutely limit and control the quantity of steam used and give proper circulation. In fact, so uniformly does this mechanism operate that on a series of tests the results were practically identical. The figures only varied 170 pounds of total steam used, which is closer than could have been expected a few years ago.

The method of plating the goods into the kier and the nature of chemicals used necessarily vary with the individual opinions of different bleachers. The plating is usually done by hand, although mechanical platers or pilers are coming into use. A double boil with lime and soda ash, and in many instances with a straight caustic solution, produced proper results until minerals were introduced into the kier. Presteeping of gray goods is of great value, often eliminating a second boil.

During the years of study it was constantly realized that the most desirable and efficient way of heating a kier would be to utilize the total number of heat units of the steam in the kier itself. It was also realized that grave danger appeared if rejected steam or condensate from any system of convection heating were returned to boilers

after becoming contaminated with caustic liquor. Leaks are liable to occur, often not easy to locate and repair. Then, too, the cost of the equipment necessary to collect and return these rejected heat units, together with loss of actual units which results through radiation, when transmitted long distances, means extra fuel cost per boil. Using the rejected heat units to preheat the liquor with which other kiers are to be charged is a good thing, but most kier boiling is done at night, the kiers having been charged during the preceding afternoon. Only a small part of the total rejected B.t.u., therefore, can be safely and advantageously utilized.

Fundamentals of Kier Problem

All of these features led to a scientific and entirely logical conclusion, namely: that the whole problem was one of charging the kier with the proper weight of caustic or other chemicals in solution with a predetermined quantity of water, and then admitting steam directly into the kier, thus putting into the kier every B.t.u. contained in the steam. This, of course, gradually dilutes the liquor; but as finally worked out from an engineering standpoint, the condition of the liquor throughout the entire boil is correct for any particular period. That is, strong solution when goods contain most impurities, the caustic attacking foreign matter first and gradually growing weaker as boil progresses. Of course, it is realized that the saponification of the foreign matter in the goods reduces the activity of the liquor, thus aiding in the maintenance of a scientifically exact balance.

After the kier has been brought to the desired temperature or pressure, as the case may be, the regulation of the remainder of the boil should be left to some mechanism to perform so that a positively timed intermittent vomit or throw will be produced similar to that of the old-style center vomit kier. This can now be accomplished and the steam consumption, during such automatic operation, held to a figure corresponding to the radiation loss for the average condition. By starting the boil with a strong chemical solution and low liquor line in the kier, this precludes the necessity for heating a large quantity of water through perhaps 200 deg. Fahr. The water added by condensation in this method of boiling does not have to be heated in the kier, since it enters as steam at possibly 300 deg. Fahr., sensible heat. By scientifically working out the proportions for any given kier it is unnecessary to allow any liquor whatever to overflow or be vented. In a properly operated kier the liquor line will be gradually raised so that the kier is never entirely filled. The only vented loss, therefore, is the small one, necessary when air is being eliminated early in the operation.

Inasmuch as this positive-timed vomiting control can be installed on either lagged or unlagged kiers, and since the action is entirely governed by an unvarying mechanism, it can be seen that uniformity has been secured. The quality is assured by the fact that the center vomit action is reproduced, except that the pipe in center of kier has been removed, allowing more space for goods, and is connected from bottom to top, but on the outside.

Results Obtained in Actual Practice

That economical operation has been attained is shown by repeated tests and records of comparative monthly fuel costs verifying the following results. The figures below are based on cold charges of liquor, and the steam consumtion is from start to finish of boil:

5-ton kier.....6,500 to 7,000 pounds steam
4-ton kier.....5,800 to 6,300 pounds steam
3-ton kier.....5,000 to 5,500 pounds steam

These results are being obtained in actual practice and without the necessity for elaborate equipment requiring constant attention both for repairs and during operation. One set of steam consumption figures from a series of tests conducted by a prominent firm of consulting engineers is given below, and shows what should be expected from two types of kiers. A heat balance worked out for each equipment checked remarkably close to actual steam required in each case. There is a time difference, as kier B did not require as much time as kier A in order to properly boil the goods. There is also a radiation rate difference due to kier A being almost surrounded by other operating kiers, while kier B was exposed to drafts on a cold night. This loss for kier A has been taken as 0.3 pound of steam per square foot of radiation surface per hour, and for kier B 0.45 pounds. In figuring the heating of the kier itself and the wet goods, proper specific heat factors have been used. It should be noted that for kier A the steam was shut off at the proper period before boiling was finished, the actual heat in the goods holding sufficient temperature, while circulation was continued, until the end of the boil. The actual steam used in each case is given below:

Kier A, Pump and Heater

Actual steam used	9,074	pounds
Length of boil	10	hours
Radiation surface—(Note: Rate of loss on Jefferson-Weedon kier higher than pump and heater kier, account of exposed location and air currents)	675	sq. ft.
Weight of kier	9,600	pounds
Weight of dry cloth	11,100	"
Weight of moisture in cloth	11,100	"
Weight of liquor in kier	20,860	"
Total weight steam (liquor) vented, estimated	100	"
Weight steam to pump (equivalent to 7.8 kw. electricity)	200	"
B.t.u. in line, steam above 68 deg. Fahr. room temperature	1,116	B.t.u.
Temperature kier before boil	68	degrees
Temperature wet cloth before boil	68	"
Temperature liquor before boil	40	"
High temperature during boil	250	"

Kier B, Jefferson-Weedon

Actual steam used	6,775	pounds
Length of boil	7	hours
Radiation surface—(Note: Rate of loss on Jefferson-Weedon kier higher than pump and heater kier, account of exposed location and air currents)	625	sq. ft.
Weight of kier	9,600	pounds
Weight of dry cloth	11,100	"
Weight of moisture in cloth	11,100	"
Weight of liquor in kier	11,070	"
Total weight steam (liquor) vented, estimated	100	"
Weight steam to pump (equivalent to 7.8 kw. electricity)	...	
B.t.u. in line, steam above 68 deg. Fahr. room temperature	1,116	B.t.u.
Temperature kier before boil	68	degrees
Temperature wet cloth before boil	68	"
Temperature liquor before boil	40	"
High temperature during boil	240	"

Kier A	B.t.u.
Radiation loss = 675 × 0.3 lb. × 10 × 1185	2,391,600
Heating kier = 9600 × (250-68) × 0.117	204,400
H'ting wet cloth = 22200 × (250-68) × 0.69	2,787,000
Heating liquor = 20860 × (250-40)	4,380,600
Vented = 100 × 1152	115,200
Circulation = 200 × 1116	223,200
	10,110,923

Kier B	B.t.u.
Radiation loss = 625 × 0.45 lb. × 7 × 1185	2,332,968
Heating kier = 9600 × (240-68) × 0.117	193,290
H'ting wet cloth = 22200 × (240-68) × 0.69	2,634,696
Heating liquor = 11070 × (240-40)	2,214,000
Vented = 100 × 1152	115,200
Circulation = (0)	.....
	7,490,154

Divide total B.t.u. by 1116 gives steam: Kier A, 9,059 pounds; actual, 9,074 pounds; unaccounted for, 15 pounds. Kier B, 6,711 pounds; actual, 6,775 pounds; unaccounted for, 64 pounds.

The simplicity of the equipment which will give the results described is shown by the cut accompanying this article.

Two-Color Effects on Silk and Cotton

Various Processes and Their Disadvantages—Old Cassella Process Offers Solution to Present Hosiery Problem—Goods Should Be Boiled Out First—Effects Obtainable by This Process

By E. W. PIERCE

THERE are a great many dyestuffs which will dye silk from an acid bath leaving cotton unstained, in fact, the majority of acid dyes have this property, and when the nature of the goods permits, the silk may be dyed in this way and the cotton dyed later in a cold bath. Unfortunately, the number of cotton dyes that will dye cold and not stain the silk, especially when the silk is in an acid condition, is so limited that this method is hardly ever used. Some acid dyes will color silk from a neutral bath, slightly tinting the cotton, and there are a few cotton dyes that will dye cotton only at a full boil. The best condition for leaving the silk clean is to have the bath slightly alkaline, but this hinders the acid dye and makes the cotton stain more. This is known as shot dyeing but it is easy to see how uncertain the dyer must be of getting the same results twice in succession. Both this and the first method also have the disadvantage that washing, or even water spots, are likely to cause the colors to run together.

Other dyers prefer first to dye the cotton in an alkaline bath and later to tint the silk, sometimes with neutral dyeing acid colors or even basic dyes. Probably most of the two-color dress goods are dyed in this way but up to this point the results are not entirely satisfactory.

Besides dress goods we now find knit fabrics of silk and mercerized cotton or viscose silk and such goods, especially hosiery, are expected to stand washing reasonably well.

Diazo Black BH

The first attempts along this line were with Diazo Black BH, which dyes cotton from a cold alkaline bath and leaves silk white. The direct dyeing was very good but when it was diazotized and developed, whether with metatoluylene diamine or beta-naphthol, the silk was old gold or brownish in tint. This is because silk itself diazotizes and then couples with the developers to produce new dyes. Some still use this method, despite the dull color of the silk, but we are limited to navy and black cotton with dull tones cross-dyed on the silk.

The Old Cassella Process

Many years ago the Cassella Color Company pat-

vented a process of dyeing sulphur dyes on cotton in the presence of silk without tinting or injuring the silk, and this process seems to offer the best solution to the problem for hosiery to-day.

The dyestuff is prepared in the usual way by dissolving in sodium sulphide, but much more concentrated baths are needed than when dyeing cotton alone Glue—ordinary carpenter's chip glue—is soaked in cold water overnight, then heated in a water jacket till melted, and added at the rate of five pounds for 100 pounds of goods. The further addition of 5 per cent of sodium phosphate is advocated by some dyers. The dye bath is kept at not over 120 deg. Fahr., better around 100 deg. Fahr., and the amount of salt is naturally less on account of the lower temperature.

The goods should be boiled out first. Some dyers advocate leaving the gum on the silk as a protection. It is removed anyhow by the sulphide bath, but a series of tests showed that boiled-off silk was really left cleaner than silk in the gum.

Effects Obtainable

Dye for an hour at the low temperature specified and then rinse thoroughly in cold water. Shades of sulphur black (some dye cleaner than others) from full tones to pale grays, blue from light sky blues to deep navies, brilliant greens, dull greens, yellows, orange, tan, brown, Bordeaux, olive and many other tones may be dyed in this way on the cotton, leaving the silk clean and white.

When the cotton is dyed it is fast to washing to a high degree and is also fast to cross dyeing and rather good toward light. The silk may be dyed with any acid dye that does not tint cotton and if the cotton is a deep shade or a black, direct dyes may be dyed in light shades so the silk will be faster to washing than it dyed with acid colors.

Apparatus Should Be Adjusted to Meet Conditions

This method is entirely practical and if the proper sulphur colors are selected the results will be very satisfactory.

The conditions need a little adjusting to the apparatus employed. If the cotton dyes too quickly and the color is only superficial it is likely to rub, but if the dye bath is right, the dyeings will be perfect. In fact, most of the bright sulphur colors give richer tones at 120 deg. than at a boil; this is especially true of the Bordeaux and red browns.

Practically all of the necessary dyes are now available in this country and, if goods dyed in this way are put on the market, the consumer will have an easy means of showing his or her approval.

Things Every Textile Chemist and Colorist Should Know

[*Note– Under this heading will be introduced as a more or less regular feature the discussion of certain fundamentals which should be a part of every textile chemist's and colorists's working knowledge. It is hoped that such discussions will instruct some of the younger readers, and serve as a review for those of broader experience and knowledge.*]

The Fundamental Difference Between Vegetable and Animal Fibers

THE vegetable and animal fibers are frequently found to act entirely differently when subjected to exactly the same treatments.

For instance, if a skein of cotton is boiled in a 3 per cent solution of caustic soda for five minutes, there is no appreciable action upon the cotton other than to cleanse it, but a skein of wool boiled the same length of time in the same reagent entirely disappears.

Boil a similar skein of cotton in a 3 per cent solution of potassium bichromate for one hour and no appreciable change takes place, but if a skein of wool is boiled the same length of time in the same reagent it will be found that a slow decomposition of the potassium bichromate has taken place and a varying quantity of an oxide of chromium has been deposited upon and within the wool fiber.

Again, put a similar skein of cotton and wool into a boiling solution of an ordinary acid dye and it will be found that the wool will gradually absorb practically all of the dye, and the cotton, none.

From these few, of the many possible illustrations, it is evident that there is some fundamental difference between vegetable and animal fibers.

A comparative study of the chemical composition of the two furnishes the explanation.

Cotton, like most of the vegetable fibers, is composed fundamentally of cellulose, which is classed chemically as a carbohydrate. The carbohydrates are composed of carbon and oxygen and hydrogen in the right proportion to form water, but contain *no nitrogen whatever*. Cellulose is rather inert chemically and displays no pronounced acid or basic reaction.

The animal fibers, on the other hand, are highly nitrogenous, i. e., nitrogen is one of their essential constituents, and they all contain as much as 17 to 19 per cent of the element nitrogen in addition to carbon, oxygen and hydrogen. Furthermore, the animal fibers

contain a particular type of substances chemically known as amino-acids, which correspond to the following general formula:

$$R \begin{cases} NH_2 \\ COOH \end{cases}$$

In the above formula it will be noted that in addition to the R which represents a more or less complicated hydrocarbon radical, there is the $-NH_2$, or amino group, and the -COOH, or carboxyl group. The amino group is, practically speaking, an ammonia residue and consequently has a tendency to impart decidedly basic properties to the animal fibers.

The carboxyl group, on the other hand, is the characterizing group of practically all organic acids and its presence has a tendency to impart decidedly acid properties to these fibers. Owing to the simultaneous presence of the two, however, the action of one to a certain extent counteracts action of the other.

Depending upon conditions, the basic action of the amino group will predominate in some cases and the acid reaction of the carboxyl group in others. It is therefore easy to see why wool and the other animal fibers are more reactive than the vegetable fibers. The greater affinity of the animal fibers for both mordants and dyes is also explained by this pronounced difference in chemical composition.

The Dyeing of Acetyl Silk

Read Before the West Riding Section, Society of Dyers and Colourists, and Presented in the "Journal" of the Society, December, 1921

By J. F. BRIGGS

THE history of artificial silk dates from the eighties of the last century, when Chardonnet introduced a fiber of collodion extruded from glass spinnerets. This silk, consisting of an ester of cellulose, had many remarkable qualities, but it possessed the grave drawback of violent inflammability, which caused the ester silk soon to give way to a cellulose silk derived from it by special methods of saponification.

After a most successful vogue the modified Chardonnet silk was forced to face a most powerful competitor in the form of viscose silk, also a hydrated cellulose fiber, which now takes the first place in volume of production. The popularity and utility of these artificial fibers have spread to world-wide dimensions, and their sphere of application has long outgrown the narrow limits of silk substitutes. They are now employed not only by themselves, but also in conjunction with cotton and wool in almost every branch of the textile industry.

As these silks emerged into the more open competitive markets, the demands made upon them for quality became more and more stringent. They were no longer used merely for ephemeral display or fashion purposes, but had to justify their existence in every-day wear. Thus, for instance, the demand arose for dyeings with the faster dyestuffs, and they were expected to survive a good many visits to the laundry. In other words, the whole range of applications was widened, and shifted in the direction of severe utility.

All this was to the good, and a vast new industry was created by twenty years of the most arduous and highly organized scientific work, in which Great Britain can justly claim the credit of the largest share. Nevertheless, there remained one or two gaps which the artificial fibers of hydrated cellulose failed to fill completely, notably their relative lack of resistance to rough treatment in the wet condition, and an absence of "liveliness" and "fullness" in the hang and handle of the finished goods. The tradition of the old original nitro-ester silk still lingered, and at various times during the last decade attention has been turned to the production of an ester silk of low hydration, which should be free from the dangerous inflammable properties of the collodion silk, while possessing its most desirable attractions.

This serves to introduce acetyl silk, the new ester-silk, as the direct outcome of the cellulose acetate industry, which came into existence for the purposes of the war. The new silk is now first entering the market as a commercial product, after having successfully overcome a series of technical problems on the manufacturing and textile side, entailing a vast amount of systematic research work. This in itself was no mean achievement, taking into account the comparatively short time available, and the unsettled industrial position of the country; it does not, however, form the subject under discussion in the present paper. Given the new product, the dyer has principally to consider the chemical and physical properties of the fiber substance itself, particularly in the points where these differ from the affinities of the hydrated cellulose silks with which he is already familiar.

Any dyer of twenty or thirty years' standing can no doubt recall difficult times in handling the older artificial silks, and even at the present day, dyeing troubles with these fibers are by no means uncommon. Such troubles are partly inherent in the physical structure of the solid filament, and are partly due to the mixing up of silk of many different origins. The chemical differences so

encountered may even occur in silk from the same maker; they are attributable to the intense chemical and physical lability of the cellulose molecule under conditions of hydration which are not always under strict control.

The animal fibers, silk and wool, are chemically defined as amino-carboxyl colloid bodies of predominant basic functions; that is to say, they exert their principal activities in their relations to acids. The cellulose fibers, such as cotton and its derived modifications, have been described by competent authorities as hydroxylated colloids of approximately neutral functions. Their affinities are determined by hydroxyl groups with acidic and basic functions fairly evenly balanced, though with a slight inclination towards the acid side. The introduction of acetyl groups into the cellulose molecule has two effects: the suppression of most of the hydroxyl groups, so that the product is no longer mainly a hydroxylated colloid, and a redistribution of the balance between acidic and basic functions, so that the acidic definitely predominate. The control of these two chemical factors defines the problem presented to the dyer in dealing with cellulose acetate silk.

After removal of traces of residual solvents, and reconditioning in the ordinary English climate (70-80 per cent relative humidity), the silk contains about 5 per cent of natural moisture, which may range between 3 per cent and 7 per cent under extreme atmospheric variations. It thus corresponds approximately with bleached cotton in its hygrometric relationships. Its relations to liquid water, however, are very different. Owing to the residual hydroxyl groups, which are present in small proportions, cellulose acetate silk is not absolutely indifferent or impervious to water. That would be undesirable from the dyer's point of view. The amount of water absorbed by the solid fiber when it is in equilibrium with the surrounding liquid is, however, far smaller than with other artificial fibers, and it is this relative resistance in the presence of water, which gives to acetyl silk its remarkable property of withstanding frequent and severe laundry operations. The quantity of water absorbed by the fully saturated fiber as it comes out of the dye bath has been estimated, after whizzing in the centrifuge, at 35 per cent of the dry weight, as compared with viscose under the same conditions giving 90 per cent. This quality of insensibility towards water is a most valuable asset of the new silk, imparting far-reaching advantages to the fabric when used as wearing apparel or undergarments. The silk, for instance, is a non-conductor, not only of electricity, but also of heat, and the problem of warmth versus weight is thus solved. Perspiration does not wet it, and evaporation from wet outer-garments does not chill the body.

A number of new and intensely interesting theoretical speculations are opened up by a study of the dyeing affinities of the new ester silk for the various main groups of dyestuffs. Without going deeply into these theoretical considerations, it is interesting to note that with few exceptions the affinity shown for the group of substantive cotton dyestuffs by the untreated acetyl silk is only slight. Thus the silk is not "stained" by the "bleeding" of other fabrics in contact with it.

Nevertheless, all these dyestuffs can be utilized, if desired, by a simple chemical treatment, either before or during dyeing. This treatment consists of a partial restoration of the hydroxyl groups by a limited saponification with caustic or other alkali as described below. On the other hand, most interesting and valuable results are obtained by taking advantage of the chemical constitution of the silk as an ester, and selecting classes of dyestuffs containing constituent groups which are in sympathy with the ester, and which dye it without any chemical modification whatever. Towards aromatic bases and basic dyestuffs the ester silk presents a definite and very pronounced absorption and fixation capacity, which appears to be attributable to the entrance of acetic acid into the cellulose molecule, and the consequent shifting of the balance of affinities towards the acid side. Further, certain chemical groups which may be regarded as sympathetic towards the cellulose ester, are at the same time members of typical ranges of dyestuffs, and also characteristic of common solvents of cellulose acetate. Dyestuffs containing these specific groups have a direct dyeing affinity for the unmodified ester silk, provided such groups are predominant.

Practical methods of dyeing acetyl silk may therefore be classified broadly under two distinct headings:

1. The *saponification method*, in which the constitution of the silk is chemically modified from the surface inwards, in such a manner as to regenerate a portion of the cellulose, which can then be dyed by the same methods, and with the same dyestuffs as the older artificial silks.

2. The *direct method*, in which advantage is taken of the properties of the silk as a cellulose ester, and dyeing is carried out with selected dyestuffs without any modification of its chemical composition.

1. *Dyeing by the Saponification Process.*—The alkaline saponification process for the dyeing of acetyl silk was first suggested some ten years ago, when it was stated that the dyeing affinities were thereby greatly modified.

This reaction has been closely studied in order to find the most favorable conditions for its application on an industrial scale. It is based, of course, on the removal of acetyl groups from the ester, and if this removal were carried to completion, the product would be a cellulose silk comparable with the ordinary denitrated Chardonnet silk. Such a complete de-acetylation is, however, not necessary in order to produce a suitable dyeing affinity for substantive dyestuffs, and since the ester quality of the silk should be preserved as its most valuable characteristic, a complete conversion into cellulose is not generally desirable. The first problem was therefore to control a partial saponification in such a manner that the proportion of acetyl groups removed should be just that which is desired. This object is easily obtained by using a definite weight of caustic soda, calculated on the weight of the silk, and causing it to react to complete exhaustion. The control thus becomes quite automatic; the acetyl groups removed are equivalent to the caustic soda em-

ployed, and no further action can take place after this quantity is neutralized.

A partial saponification can take place in two ways, either the caustic soda can penetrate and then saponify—the result would then be a general and uniform lowering of the acetyl value of the total ester; or it can saponify immediately it comes in contact with the surface of the fiber, and before it has time to penetrate to the interior. In this case, the result would be a superficial coating of pure cellulose, graduating up to unmodified cellulose acetate towards the interior. It would appear that the highest efficiency is to be expected by the latter method, since for any given consumption of soda it represents the maximum formation of cellulose, and the minimum alteration of the original ester.

A method of analysis has been worked out for the study of the composition of any given product of partial saponification. The proportion of completely unmodified cellulose ester is determined by repeated extraction of the silk with dry boiling acetone, until no more soluble matter can be extracted. The insoluble residue is weighed and consists of pure cellulose, together with cellulose acetate so modified by partial saponification that it is no longer soluble in acetone. The cellulose may be determined in this residue, or in a fresh portion of the original sample, by extracting it three times in succession with ten times its weight of active cuprammonium solvent, the time of contact being not more than two minutes for each extraction. The extract is immediately acidified, and the precipitate collected, washed, dried and weighed. The insoluble residue may also be weighed as a control. This treatment is sufficient to dissolve all the pure cellulose, together with only a small quantity of the lowest acetate of cellulose, the major bulk of the modified ester and the whole of the unmodified cellulose acetate being unattacked by the cuprammonium in the short time allowed for the extraction.

A typical example of silk saponified in a 50 to 1 bath with 10 per cent of caustic soda at 75 deg Cent showed by this scheme of analysis:

Cellulose, soluble in cuprammonium	23% (outer layer)
Unmodified cellulose acetate, soluble in acetone	67% (interior core).
Modified layer, insoluble in acetone and cuprammonium	10% (intermediate layer)

The above considerations lead one to adopt for practical use conditions which favor a high intensity of the intial reaction, whether by working at high temperatures with dilute solutions of caustic alkali, or with high concentrations at lower temperatures. The action then proceeds evenly from the surface to the interior, and the degree of dyeing affinity produced is proportional to the amount of caustic soda consumed.

The process may be carried out in two ways, either by the single bath method, in which dyestuff and alkali are allowed to work together simultaneously, and the dyestuff is absorbed as the saponification proceeds; or else by the pre-treatment method, in which the saponification is conducted as a separate process and the saponified silk is afterwards dyed in the ordinary way just like the older varieties of artificial silk. Good results are obtained by either method of working—some dyers prefer the one, and some the other; others adopt one or the other method according to the nature of the work.

On this principle any of the basic, substantive, sulphur, and vat dyestuffs can be easily dyed to full shades.

2. *Dyeing in Virtue of Ester Affinities without Chemical Modification of the Silk.*—It is necessary to correct an impression based on statements which have appeared in text books, and in the technical journals, to the effect that cellulose acetate silk cannot be dyed directly without the use of swelling agents or other costly and difficult pre-treatments. Such statements may have had a foundation of truth when applied to the earlier types of acetyl silk produced more or less on an experimental scale in foreign countries some five to ten years ago. Historically, the method of dyeing with the assistance of swelling agents is the oldest, but commercially these methods have, at the moment, no general importance. A swelling agent, however, is merely a suppressed solvent of the ester, and progress in the way of "mordanting" along these lines is by no means to be excluded. At the present time, and with the silk manufactured at Spondon by the Dreyfus process, no swelling agents are required, and we have the authority of one of the foremost dyers in this country for the assertion that the silk can be dyed without any modification or pre-treatment, to any desired shade and degree of fastness just as easily and just as cheaply as any of the older artificial silks on the market.

Only it stands to reason that the dyestuffs most usefully employed are not always the same. Just as wool and cotton have each their particularly suitable classes of dyestuffs, as well as many in common, so acetyl silk and viscose silk show special differences in affinities as well as certain similarities. Already the more enterprising manufacturers of dyestuffs are realizing this fact, and are preparing special lists and pattern cards representing "Cellulose Acetate Dyestuffs," recommended for dyeing this silk without chemical modification.

This method of dyeing the untreated silk by selected dyestuffs having a sympathetic affinity for the cellulose ester has been closely studied by Dr. R. Clavel, representing one of the most important dyeing and finishing companies in Switzerland, Messrs. Clavel & Lindenmayer, of Basle.

The basis of selection is by chemical constituent groups favorable to the absorption and fixation of the dyestuffs, such as amino and alkyl-amino groups, hydroxyl, nitro and ketonic groups. Sulphonic acid groups have a definitely unfavorable influence, which increases with the number of sulpho groups present, but which in certain cases is counteracted in a favorable sense by the other groups in the molecule.

Clavel adopted the method of dyeing basic dyestuffs

in the presence of magnesium chloride, which increases the efficiency of the bath. He also recommended the addition of small quantities of aniline hydrochloride to the dye bath when dyeing the simple mono-azo acid colors. In selecting the azo dyestuffs, preference is given to those which contain no sulphonic acid groups, and yet are soluble to some slight extent in water. Examples of this type are Terra Cotta and Azochromine (Geigy), and their equivalents by other makers. The Metachrome colors of Brotherton also contain several useful members.

Very important discoveries made by Clavel relate to the direct dyeing of the Gallocyanin and Alizarin dyestuffs without mordants. Dyestuffs of the Gallocyanin type have an affinity for the ester, both in virtue of the basic function of their alkylamine groups and the phenolic function of their gallic acid groups. These dyestuffs yield shades of violet, blue and gray, many of which are extremely fast to light and washing. Violet PDH (Durand & Huguenin) deserves particular mention because its direct affinity for the ester silk is very high, and the qualities of the dyeings are extremely satisfactory.

The Alizarin dyestuffs dye directly without a mordant in virtue of their phenolic and ketonic functions, but the shades obtained on unmordanted silk are not always the same as those usually associated with the alizarins when dyed on mordants.

By a suitable selection of dyestuffs from the basic, acid, gallocyanin and alizarin groups, it is possible to devise a range of simple and compound shades which cover the scale practically completely, and with care in the selection of the dyestuffs, all the commercial demands for fastness for different purposes can be easily satisfied. Moreover, the range of available dyestuffs is being constantly enlarged. For instance, the principle and the details for developing fast azo colors on the fiber by the diazo method have been worked out, the application of Aniline Black and other oxidation dyestuffs to acetyl silk has been investigated and brought to a commercial issue, and the successful dyeing of the vat colors without the necessity of modifying the constitution of the ester by saponification, as formerly, is now reported.

In Switzerland, where the extraordinary qualities of the finer counts of acetyl silk are very highly appreciated, especially by the ribbon weavers, the experts are most enthusiastic in their reports, stating that in appearance, elasticity and handle, this silk is nearer the real silk than any artificial silk yet produced. Messrs. Clavel & Lindenmeyer are actually dyeing large quantities of these fine counts, on behalf of the Swiss weavers, for the Paris trade.

At the same time acknowledgments must be made of the important work contributed by British firms of dyers such as Messrs. Burgess, Ledward & Co., Manchester, Messrs. Samuel Heap & Co., Rochdale, Messrs. Hicking & Co., Messrs. Thos. Adams & Co., Messrs. Hicking and Pentecost, and Messrs. Dobson & Co., of Nottingham, and by the chemists of the British Dyestuffs Corporation, Ltd., in the development of these processes on a commercial scale. Messrs. Horsfall & Sanderson, of the latter Company, have communicated a method of dyeing insoluble dyestuffs such as Induline, Nigrosine, Rosaniline, and other bases from a fine suspension of the dyestuff by pouring its alcoholic solution into a large volume of water. They have also developed a method of "dry dyeing" from benzene, containing a small quantity of an alcoholic solution of the dyestuff.

Applications.—Before dyeing, it is very important to wet the silk out in a bath made up with soft water at 45 deg. Cent., containing about 2 per cent of hard coap, and 4 per cent of commercial ammonia solution 13.5 per cent NH_3), calculated on the weight of the goods, in order to remove the grease and dirt from the surface of the fiber. The silk is worked for twenty minutes, and then rinsed in two changes of soft water. It is next soured in a bath containing 2½ per cent of hydrochloric acid (30 per cent HCl) on the weight of the goods, and finally rinsed.

Basic Dyestuffs.—All the basic dyestuffs can be dyed readily on acetyl silk without previous treatment. Tannin mordants are unnecessary since the affinity between the dyestuff base and the acetyl groups of the ester is sufficient to fix the dyestuff without assistance. The bath is generally set up with 1 or 2 per cent of acetic, and from 5 to 20 grams of magnesium chloride per liter of bath. In some cases common salt may replace a part or the whole of the magnesium salt.

In dyeing basic dyes, the temperature of the bath should be carried up to 65 deg. Cent. in two stages. At that temperature equilibrium is reached in about one hour. All basic dyeings should be finished out of acid water ("avivage") using acetic, formic, or tartaric acid. By mixing a little olive oil emulsion with this bath, a remarkable "scroop" finish may be obtained.

Many of the basic dyestuffs are extremely fugitive to light, and some of them, such as Auramine, Chrysoidine, Bismarck Brown, and Methylene Blue, while giving beautifully bright shades, have to be used with caution. On the other hand, certain of the basic dyestuffs are much faster to light on acetyl silk than they are on the older types of silk, or tannin-mordanted cotton. A very notable instance is Malachite Green; Magenta is also faster on this silk than on other fibers. Setocyanin and Setoglaucin, blue dyestuffs allied to Malachite Green, also share the same property of remarkable fastness to light. Typical of a class of basic dyestuffs of the oxazine group, exceptionally fast to light, are Capri Blue and Cresyl Blue. Combinations of the above-mentioned dyestuffs cover the scale of bright blues, royals, saxes, mauves, and greens. Rhodamine S gives a bright pink of good fastness, and the Methyl Violets are useful on account of the full bright shades obtainable. All the basic dyestuffs are characterized by very easy leveling qualities, and further examples of this type are under investigation, the results of which will be communicated in due course.

Gallocyanin Dyes.—The dyeing of these is closely similar to that of the basic dyes; they are, in fact, basic oxazines, containing gallic groups. Violet PDH and Mod-

ern Violet (Durand), among others, may be cited as typical of the class. The dyestuffs are sensitive to metallic salts, and should not be dyed in copper baths. The dyestuff should be dissolved in cold water, and dyeing started in a cold bath, the temperature being gradually raised. The affinity of these dyestuffs for acetyl silk is so great that it is necessary to prevent them from rushing on too quickly. This high affinity also enables them to be used very economically, and Violet FDH is a main constituent of most dark colors, such as navy blue, black, and nigger brown. It is shaded by using in conjunction with Malachite Green for navy and Azochromin for black and brown. After dyeing, the goods should be soaped to remove all tendency to rubbing, and the ultimate shades should be developed and fixed by aftertreatment with bichromate and acetic acid Celestine Blue B, Coreine RR, Gallamine Blue, and Gallo Sky Blue are also useful members of this series.

Alizarine Dyes.—The alizarines are generally dyed from a plain bath in soft water. The dyestuff feeds on in virtue of its chemical affinities, even though it is only very sparingly soluble in the water. Some of the dyeings change shade on treatment with soap, but the original color returns on acidification. Alizarin Orange AO (nitro alizarin) is a very useful member of this series, fast to light. It is used for shades ranging from salmon pink to old rose. Alizarin Garnet is not sensibly changed by soap, and is largely employed in the Clavel prescriptions. Alizarin Green S gives a very pleasing shade of gray, in the dyeing of which the temperature should be carried up to 75 deg. Cent. Alizarin Blue ABS gives a reddish-blue, fast to light.

Azo Dyes.—Certain of the sulphonated azo dyestuffs can be dyed directly on acetyl silk, chiefly yellows, oranges, and some of the reds, notably Roccelin. Azo Yellow I and Metanil Yellow are useful, and fast to light. Azo Yellow is frequently employed as a bottom for emerald and jade greens, topped with a basic green or blue. There are also a number of simple azo dyestuffs not containing sulphonic groups which dye the silk directly, and are fixed either with or without aftertreatment by chroming. To this series belong the so-called Alizarin Yellow 3G, and Alizarin Orange R, salicylic acid derivatives fast to light. Very frequently what is substantially the same dyestuff is sold under several different names, and it is difficult to mention all. There are a number of browns in this series which may be typified by Azochromin, but they are not all identical in constitution since some are fast to light and some are not; most of them require development and fixing by afterchroming. Alliance Fast Brown 5G paste (British Dyes) may be mentioned here. Messrs. Brotherton's, the makers of the Metachrome dyes, have selected a number of dyestuffs suitable for acetyl silk, including an interesting fast-to-light bluish pink, called Rose Pink CA58. Messrs. Durand and Huguenin offer Chromocitronine, Chromoxanthine, and Chrome Deep Brown RR.

Indigoid and Other Vat Dyes.—Vat dyestuffs, including the Indigoid and those of the Algol and Indanthrene class, which can be vatted without the use of large quantities of caustic soda, are suitable for dyeing unsaponified acetyl silk, saponification during dyeing being inhibited by the presence of an ammonium salt. Sulphur dyestuffs also, when reduced in the same manner as ordinary vat dyestuffs, should give useful results for fast shades. These methods are still under investigation, but fine shades of fast pinks and blues have been produced with Durindone Red Y, Ciba Blue, Indigo Blue paste, etc.

Development Dyeing by the Azoic Process.—The remarkable affinity of cellulose acetate for aromatic amines and phenols suggests a vast range of possibilities for developing azo dyestuffs by diazotizing on the fiber. This principle was suggested many years ago, but it has been taken up in detail and perfected in recent times and the field greatly extended. There seems, in fact, no limit to the possible combinations obtainable, and it only remains to sort out those items which are of the greatest practical utility and fastness.

The amines are dissolved in the form of their hydrochlorides, and the silk is treated with these solutions very much in the same manner as if dyeing with a basic dyestuff. If the amines themselves are colored, as for instance *m*-nitro-*p*-toluidine, aminoazobenzol, etc., the silk may actually be matched to a standard undeveloped shade, as when dyeing Primuline on ordinary cellulose. When the amines are colorless, it is necessary to work according to formulæ, and to make trial developments from time to time. The advantage of this method lies in the fact that the excess of dye bath may be washed off, and there is no danger of precipitating loose color on the surface of the fiber. Contrast this with the common method of dyeing cotton with Paranitraniline Red, where chemical affinities do not exist. The diazotizing of the prepared silk, and the coupling with alkali phenolates result in beautifully bright shades, perfectly fast to washing and rubbing.

Aniline Black.—The attractive affinity for aromatic amines makes this silk eminently suitable for dyeing by the Aniline Black method. This process has also been worked out, using a silk previously mordanted with anilin hydrochloride solution, and then impregnated with a strong aniline hydrochloride, chlorate and copper liquor. It is whizzed, hung up, and oxidized for 1 to 1½ hours at a temperature of 40 to 60 deg. Cent., aftertreated with acid bichromate and shaded up.

These considerations will suffice to show that the dyeing of acetyl silk is not more difficult than the dyeing of any other artificial fiber; it is only somewhat different. The differences, however, are no greater than those which divide cotton from wool. The dyer has only to get used to it, just as in the old days he had to get used to Chardonnet, viscose, etc. Plenty of dyestuffs are available, and plenty of methods, and both these are being increased all the time. Especially the azoic method offers attractive possibilities of future extension and gives dyeings of unexampled solidity and brilliancy. As the demand develops, dyestuff makers will bring forward new dyes specially designed for this silk. The silk itself, both in

handle and appearance, is manifestly superior to anything which has gone before. Difficulties in manufacture, in application and in dyeing, have been encountered and surpassed, and the new industry is now both technically and commercially established. Nothing can effectually obstruct its development, and there is a big future before it.

TREATING SILKS

AN English patent (161,625) taken out by E. L. Maupai, of New York, protects a process of treating silk, one of the objects being to dye single-thread or grege silk, containing natural gum, while in the hank or warp.

The dyeing of untwisted silk containing natural gum while in the hank or warp to produce a fast color is difficult, because the gum in the silk tends to dissolve, causing the hank to become a compact mass, which makes weaving or throwing almost impossible.

It has previously been proposed to treat raw silk with formaldehyde to convert the sericin into a permanent coating insoluble in hot liquids.

The present process consists in treating raw silk threads or grege to harden or render the gum or ceraceous matter of the silk insoluble in dyeing liquors, dyeing the silk thus treated, and, after weaving, removing the gum or ceraceous material from the silk fabric.

By hardening the gum the danger of the silk becoming a matted mass is avoided. The final step of removing the gum from the woven fabric gives it a superior luster.

Partial hardening of the gum in the silk is effected by subjecting the hank or warp to an acid bath, sulphuric or hydrochloric acid, diluted with warm water.

The silk is then treated with a solution of alum, or of chrome acetate, or of chrome chloride, or of nitrate of iron (or any iron liquor used in dyeing), all depending upon the color to be used for dyeing. The action of these fixing elements is still further to harden the gum, so as to produce an insulation around each thread protecting the hardened gum in or on the threads against the action of the alkali and acid present in the dyeing solution.

The threads thus treated will be pliable but firm, and can be worked for a considerable length of time in the dyeing solution without affecting the ceraceous matter or gum present in the silk.

The silk may be dyed in the usual manner. The dye employed, of course, must have an affinity for the particular mordant used.

As an example, the silk is first treated with a 10 per cent solution of sulphuric acid for about twenty minutes at about 150 deg. Fahr. It is then suspended to be hardened in a bath—for instance, a solution of chrome chloride of a strength 10 deg. B., at about 150 deg. Fahr.—for one hour and dyeing is proceeded with in the usual way.

When the raw silk has been dried after dyeing it will be ready for weaving. After weaving the fabric will be boiled in a strong solution of soap and water, which will eliminate the gum or ceraceous matter and bring out the color and luster in the fabric.

The gum is therefore retained until after dyeing and weaving. The retention of the gum maintains each thread in the hank an individual element, and hence they can be readily separated when they are to be woven or thrown. The dyeing operation is not in the least hampered by the presence of the gum, as the dye will penetrate the gum but will not soften or dissolve it, owing to the hardening process. As the dye will penetrate and pass through the gum, the silk fiber will be dyed.

One of the advantages of the process is that the threads comprising a hank of silk can be treated in untwisted condition in hanks or warps; in other words, the natural gum is preserved or hardened in and on each thread composing the hank, thus enabling the storage of the hanks for dyeing at a future time. Hence, silk threads can be preserved for a considerable length of time by subjecting them to the hardening.

SAFETY IN THE DYE PLANT

When accidents occur and one or more persons are burned with acids or other corrosives, it is usually due to (1) mistakes in handling, (2) bad containers, (3) slopping or spattering, (4) material left in containers supposed to be empty. Also, these accidents are more often due to bad types of "tools" than to workmen or workmanship. The nails in bottoms of carboys are destroyed by sloppages, and when the carboy is lifted the bottom drops out, or the crockery pitcher is cracked and suddenly drops off the handle, or the supposedly empty carboy is turned over and spills some acid which could not be entirely drawn off when the carboy was in the rocker or inclinator, etc.

In most States laws require compensation insurance, and many concerns also carry additional protection against liability for accidents. But the policies do not repay the cost of the foreman and witnesses, and in the long run it is not only economical but decidedly more human and desirable to safeguard against accidents in so far as it is possible to do so, and certain new equipments for handling corrosives are creating widespread interest accordingly.

First, there are pails and dippers of Monel metal for handling sulphuric acid, acetic acid, caustic potash and soda bleach, and which are also suitable for solutions of most of the sulphates, sulphites, sulphides, acetates, etc. Then, there are copper pails and dippers for acetic acid

solutions and other usual uses. Rubber buckets, pitchers and dippers are available for handling muriatic acid and solutions of chlorates and chlorides. Also, but particularly for only nitric acid and solutions of nitrates and nitrites, there is a very complete line of pails, pitchers and dippers cast in aluminum.

For handling carboys there are new devices which show a complete understanding of the field and need, viz.: a carboy truck that works like a pair of scissors to fit any size of carboy; a carboy carrier which is very economical and effective for combined carrying and dumping operations when the entire contents of carboys are used; and a special carboy dumper which is designed to permit easy and accurate drawing of small quanti ies—to the last drop—and safeguard against slopping and accidents from loose bottom boards, etc.

From the interest and approvals already given to these equipments by safety councils and engineers, it seems likely that they will soon be desired, if not required, wherever there is any considerable manufacture or use of corrosives.

FOREIGN DYES LICENSED BY TREASURY DEPARTMENT FOR DECEMBER IMPORT

Germany Makes Sweeping Gain; Switzerland Loses More Ground; England Holds Her Own, and France Sends Nothing

Following is a complete list giving the types and quantities of dyestuffs for the importation of which into the United States licenses were granted by the Treasury Department, Division of Customs, Dye and Chemical Section, during December. This tabulation is being issued by the American Dyes Institute, and it is announced that anyone interested in the manufacture of dyestuffs who has not received a copy may obtain one by application to that organization's headquarters, 320 Broadway, New York City.

An appended note by the Treasury Department states: "Licenses shown by this list to have been issued for particular commodities must not be considered as a precedent or assurance that favorable action will be taken on future applications for similar commodities. The Treasury Department, Dye and Chemical Section, announces in special cases that it is its practice to consider any special evidence that may be submitted by manufacturing consumers of dyestuffs tending to prove that the American commodity, while satisfactory in general or for some lines, will not meet the requirements as to quality or adaptability for particular manufacturing purposes."

The December list shows that Germany, which during the preceding month ranked far below Switzerland, made a sweeping recovery and sent us 149,365 pounds, as against only 92,864 pounds in November. These figures, however, are low when compared to her imposing totals of 418,344 pounds in October and 488,-912.8 pounds in September. Germany heads the list this month, with Switzerland by no means a bad second. The Country of Cantons forwarded to American dye consumers during December a total of 120,702 pounds, representing a decline from the 189,018 pounds sent in November, and a further decline from the 316,-531 pounds of October. England contributed 38,720 pounds, substantially the same as in November, when she forwarded 38,330 pounds, and a substantial gain over the 33,103 pounds of October and a further gain over the 29,010 pounds of September. Once more France fails to figure in the month's list of licensed importations, the 880 pounds sent here in October representing the only contribution from that source in several months.

The total quantity of dyes imported, under license, during December was 308,787 pounds, as against 320,-212 pounds in November, 768,858 pounds in October and 621,190.8 pounds in September.

The detailed list follows:

Designation of Dye	Germany (lbs.)	Switz. (lbs.)
Aceto Purpurine SB	880	....
Acid Blue RBF	....	297
Acid Pure Blue R Supra	....	500
Acid Rhodamine BG	100	....
Acid Rhodamine 3R	....	1,540
Acid Violet BW	100	....
Acid Violet 6BN	....	264
Acridin Orange	....	440
Algol Blue 3G Powder	214	....
Algol Brilliant Violet 2B Powder	200	....
Algol Brown R Powder	200	....
Algol Corinth R Powder	50	....
Algol Orange R Powder	100	....
Algol Red B	1,000	....
Algol Red B Powder	258	...
Algol Red 5G Powder	50	....
Algol Violet B Paste	100	....
Algole Blue 3R Powder	20	....
Algole Green B Powder	20	....
Aliz. Black WX Ex Paste	2,500	....
Aliz. Blue Black B	100	....
Aliz. Blue Black B Powder	500	....
Aliz. Blue G Powder	200	....
Aliz. Blue SAE	500	....
Aliz. Blue SAWSA	1,500	....
Aliz. Blue SB Powder	25	....
Aliz. Blue SKY	100	....
Aliz. Claret R	200	....
Aliz. Cyanine Green 3G Powder	300	....
Aliz. Delphinol BS (from England 520 lbs.)	....	....

(*Continued on page* 56.)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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CORRESPONDENCE

In the December number of the REPORTER, on page 10 of the Proceedings of the Association, there was published a letter received by the president from the secretary of the Society of the Dyers and Colorists. We now publish the following reply to this letter.

November 28, 1921.

A. SILVERWOOD, HON. SEC.,
SOCIETY OF DYERS AND COLOURISTS,
BRADFORD, ENGLAND:

Dear Sir—Enclosed you will find an official reply to your letter of October 25. The long delay in replying has been due to the fact that I had hoped to be able to send you a complete copy of the proceedings of our inaugural meeting. For various reasons the publication of this has been unavoidably delayed, and I have therefore decided to write to you without any further postponement.

For the time being the AMERICAN DYESTUFF REPORTER is to act as the official journal of our Association, publishing our proceedings, etc. The December number will contain a complete report of our inaugural meeting, and I will forward a copy to you as soon as it is published which will probably be in about a week. We should be pleased to have you give as much publicity as you think advisable to the formation of this Association in the "Journal of the Society of Dyers and Colourists," particularly in regard to the fact that the American organization would be pleased to co-operate in every way possible with the British Association.

I received this morning the prospectus of the Color Index, to be published by the Society of Dyers and Colourists. This will be an extremely valuable publication and we shall all be glad to get away from the more or less stereotyped Schultz tables and continual reference to them. I do not know what scheme you have followed out in regard to American dyes, but I trust that every effort is being made to incorporate an accurate record of American made dyes along with the others.

Some time ago I wrote to you inquiring in regard to the possibility of publishing a collective index of the "Journal of the Society of Dyers and Colourists." I suppose, with the publication of this Color Index on your hands at the present time, you have all that you can take care of without any additional work. I still believe, however, that the publication of such a collective index of the "Journal" would be extremely valuable and well subscribed for. I should like to know if plans for this were entirely given up, or whether it is still the intention of the Society to publish such an index at some future time.

In closing, I wish to personally assure you of the co-operation of the newly formed American Association in every way, and I trust that as early as possible you will send a reply to my enclosed letter which may be presented to the Council of the American Association of Textile Chemists and Colorists.

Sincerely yours,
(Signed) LOUIS A. OLNEY.

The following letter is in reply to the one published above and another unpublished letter in regard to the Color Index which is being published by the Society of Dyers and Colourists and also in regard to the publication of a collective index of the thirty-seven volumes of their journal.

SOCIETY DYERS AND COLOURISTS
December 28, 1921.

PROFESSOR LOUIS A. OLNEY,
LOWELL TEXTILE SCHOOL,
LOWELL, MASS.:

Dear Sir—I thank you for your letter of the 25th ult., along with the official letter from the American Association of Textile Chemists and Colorists. These were brought before my Council at the last meeting and I was instructed to offer any assistance that we can give you.

We were unable to suggest any concrete scheme of co operation as we had very little knowledge of the progress you have already made.

We notice that you have made arrangements for

monthly publication and we think that this is the most important point. In our own case, success depends largely upon the quality of our "Journal," which is itself an indication of the amount of work done for the Society.

We have found the formation of local Sections to be a great help to us and we venture to suggest that you might profitably follow our lead in this.

If you have thought of any scheme of co-operation or come across any point on which we might help, we shall be pleased to hear from you.

With reference to the other matter in your letter, every effort has been made to obtain an accurate record of all American dyes and we have already received from some makers all the information we required.

Te Collective Index of the "Journal" would most likely have been in hand at the present time if we had not decided upon the publication of the Color Index. It is hoped to proceed with this during the coming year.

Yours sincerely,

(Signed) A. SILVERWOOD.

Table I (below) and Table II (right) are supplementary to Wallace J. Murray's paper on "Differential Reduction of Vat Dyes," which was published in the issue of January 2. The tables were omitted at that time because of lack of space.

TABLE II

Sulphur Colors

Dye Used	Reaction with Sodium Hydrosulphite	Reaction with Sodium Sulphide
Brilliant Sulphur Blue BG Conc. Grasselli	Orange	Dark brownish purple
Sulphur Brilliant Blue 6B An. Dyes and Chem.	Yellow	Greenish brown
Sulphogene Navy Blue RC Du Pont	Yellow	Greenish brown
Sulphur Sky Blue B Amer. An. Prod. Co.	Orange	Greenish blue
Sulphur Indigo Blue B Newport	Orange	Violet

TABLE I.

Reducing Agent	Temp.	Reaction	Indigo	Midland Blue 5B	Midland Vat Blue MB	Midland Blue R	Ciba Blue 2B	Indigo Pure ADC	Hydrone Blue B	Anthrene Blue GCD	Anthrene Dark Blue B.O.	Thio Indigo Red B	Sulfur Indigo Blue B
Sodium Hydrosulfite	Boiling	Speed of Reduction	rapid	rapid	very rapid	very rapid	very rapid	rapid	rapid	rapid	rapid	rapid	rapid
		Color Solution	yellow	yellow	yellow	yellow	yellow	yellow	yellow	red-brown	red-purple	yellow	orange
		Dyeing	good	good	good	good	good	good		poor			
		Condition	clear	clear	clear	slight ppt.	clear	clear					
	Cold	Speed of Reduction	moderate	moderate	moderate	moderate	rapid	moderate	slow	rapid	rapid	moderate	moderate
		Color Solution	yellow	yellow	yellow	yellow	yellow	yellow	yellow	red-brown	red-purple	yellow	yellow
		Dyeing											
		Condition	finally clear		clear	slight ppt.	clear						
Sodium Stannite	Boiling	Speed of Reduction	slow	rapid	rapid	rapid	rapid	rapid	rapid	slight	moderate	rapid	very rapid
		Color Solution	green	yellow	pale orange	yellow	yellow				red-purple	yellow	orange
		Dyeing	poor					good					
		Condition	turbid	not clear	orange ppt.		clear	yellow					brown ppt.
	Cold	Speed of Reduction	almost none	moderate	moderate	moderate	moderate	moderate	moderate	very slow	very slight	very slow	rapid
		Color Solution	green-ish	yellow	yellow	yellow	yellow	yellow					orange
		Dyeing					poor						
		Condition	undis-solved	precipi-tate	yellow ppt.		brown ppt.						brown ppt.
Sodium Sulfide	Boiling	Speed of Reduction	none	slight	slow	very slight	moderate	fair	very slight	none	none	moderate	rapid
		Color Solution	blue	green	orange	yellow	orange	green				orange	violet
		Dyeing	none				good	fair				good	
		Condition	undis-solved	large ppt.	ppt.	ppt.		ung red	comp.				
	Cold	Speed of Reduction	none	none	none	none	very slight	none	none	none	none	slight	rapid
		Color Solution	blue	blue									violet
		Dyeing	none										
		Condition	undis-solved	undis-solved	undis-solved	undis-solved							

NOTICE FROM THE SECRETARY

Owing to the date on which the January 16 issue went to press, there was no opportunity for the preparation of material for an account of the recent meetings of the Council and of the Research Committee of the Association, which were held Friday, January 13, at the Engineers Club, Boston, at 4 P. M. and 4.30 P. M. respectively. These will appear in the January 30 issue of the Proceedings.

All members of the Association are urged to follow the suggestion of the president that letters be written stating the type of material they would like to see published in this section, since it is the desire of those responsible to publish all available or obtainable material which might be interesting or useful.

It is again suggested that all individuals who believe they are eligible for membership in the Association, or members acquainted with such individuals, communicate with the secretary, who will furnish application blanks and extend every possible assistance.

W. E. HADLEY, Secretary,
5 Mountain Avenue, Maplewood, N. J.

VOLUNTEERS WANTED TO ASSIST IN GERMAN TRANSLATION

The following letter from H. A. Mereness to E. H. Killheffer, and the latter's reply thereto, are self-explanatory. It is hoped that some members may be sufficiently interested to offer their services as collaborators with Mr. Mereness in this work. Any member who is willing to assume responsibility for the translation of a few chapters should communicate with Mr. Killheffer at the Newport Chemical Works, Passaic, N. J.

163 Mt. Pleasant Street,
New Bedford, Mass.,
January 10, 1922.

MY DEAR KILLHEFFER:

As chairman of the Library and Publication Committee you are perhaps the proper person to consider the following proposition:

I have a copy of a book by F. Erban, entitled "Amwendung von Fettstoffen in der Textil Industrie," and, after having used it for a couple of years, have concluded that its merits warrant translation. It contains 360-odd pages on the application of fatty products to textiles, including about ninety pages on the manufacture of Turkey Red Oils and similar products. Its references to patents and literature are complete (as most German books are likely to be). Several of the fellows who have seen it thought it might be a good idea to make the translation.

I do not feel that I could undertake the translation of the whole 360 pages single-handed but thought that three or four of us in the Association might take those parts with which we are most familiar and thus get the translation done in a manner not burdensome to any one.

The book is not copyrighted. Are you interested and do you care to see the book?

Very respectfully,
(Signed) HARRY A. MERENESS.

January 13, 1922.

HARRY A. MERENESS,
163 MT. PLEASANT STREET,
NEW BEDFORD, MASS.:

Dear Sir—I have your letter of January 10 and believe that a translation of the book you have would be very interesting indeed.

Perhaps it could be arranged that a number of translators could have a hand in the work; for instance each man to take several chapters and in that way the entire burden would not rest on any one person.

I will put a notice calling attention to this matter in with the other notices of the Association in the next issue of the AMERICAN DYESTUFF REPORTER, and perhaps we can secure enough volunteers to put the work through.

Yours very truly,
(Signed) ELVIN H. KILLHEFFER.

INAUGURAL MEETING, RHODE ISLAND SECTION

Held Friday, December 30, at the To Kalon Club, Pawtucket, R. I.

A MEETING to organize the Rhode Island Section of the American Association of Textile Chemists and Colorists was held on Friday, December 30, 1921, at the To Kalon Club, Pawtucket, notice of the meeting having been sent to all members of the Association located in Rhode Island.

Following an informal dinner the meeting was called to order at 8 P. M. by William H. Cady, vice-president of the Association, who announced that a petition signed by twenty-six members, requesting the formation of a Rhode Island Section, was presented to the Council on November 18 and approved by them. It was unanimously voted to organize the Section at once and Mr. Cady was elected temporary chairman, and Henri N. F. Schaeffer temporary secretary. The chairman was authorized to appoint a committee of five to prepare nominations for permanent officers of the section and present them at the next meeting. The following were appointed:

Ralph F. Culver, chairman
Peter J. Ariente
Nelson Barlow
John A. Kydd
Henri N. F. Schaeffer

This committee was also instructed to arrange a program for the next meeting. It was voted to hold meetings every six weeks except in summer. A poll of the members indicated a preference for Friday evening. The chairman announced that he was negotiating with the Providence Engineering Society and hoped to secure the use of the Society rooms for the meetings of the Section.

Roscoe L. Chase, former manager of the Arnold Print Works, gave an informal talk on "Mercerizations" (see abstract which follows). At the close of the discussion a vote of thanks was accorded to the speaker.

The chairman gave a brief account of the work of the Council and outlined the plans of the Research Committee for a systematic investigation of the problem of standardizing methods of determining the fastness of dyes on the various fibers (to washing, light, etc.).

The meeting adjourned at 9.25. Twenty-six members and two guests were present.

MERCERIZATION

[*Abstract of an address delivered by Roscoe L. Chase before the Rhode Island Section of the American Association of Textile Chemists and Colorists at the To Kalon Club, Pawtucket, R. I., on Friday, December* 30, 1921.]

The speaker first gave a brief history of the evolution of the art of mercerizing since Mercer's time, pointing out that Mercer's original patent, taken out in 1851, covering the action of caustic alkalies on cotton, referred only to the shrinkage produced and the increased affinity for dyes. The possibility of obtaining a luster by treating cotton with caustic under tension was not discovered until 1889, when Lowe in England took out a patent, followed in 1895 by Thomas and Prevost in Germany.

Caustic soda is universally used as a mercerization agent, and the speaker called attention to the fact that there are three different methods of comparing the strength of commercial caustic; namely, the Castner electrolytic method, which expresses in degrees the actual percentage of Na_2O present; the Newcastle method, based on an erroneous atomic weight for sodium, which gives figures 1.3 per cent higher than the actual values; and the New York and Liverpool method, even less correct, which gives figures more than 3 per cent too high. This makes it advisable for the purchasing agent in buying caustic to specify the particular method by which its strength is to be calculated.

The lecturer next described the various types of mercerizing machines which have been used from time to time, mentioning in particular the Kleinewefer centrifugal yarn machine, now obsolete, which rotated at 1,800 revolutions per minute, and depended on centrifugal force to counteract the shrinkage; and, passing to cloth mercerization, he referred to various early attempts to prevent transverse shrinkage, notably that of Jeanmaire, who passed the impregnated cloth over a series of cylinders with roughened surfaces. When tenter frames first began to be used, for the purpose of preventing shrinkage, it was the custom to roll up the cloth from the pad and let it lie and subsequently tenter and wash. During those early days various schemes were suggested for reducing the tension due to shrinkage, such as the addition of alcohol, naphtha, mineral salts, etc., to the caustic but none of these ideas ever met with much success.

The speaker described in an interesting way a visit which he made in 1902 to several of the largest mercerizing plants in Europe, and went on to compare the relative merits of mercerizing cloth in the gray and in the bleached state, pointing out in particular that strong caustic soda acting on starch tends to make it insoluble, consequently it is advisable in mercerizing gray goods to remove the starch beforehand, either by the action of diastafor or by souring. With regard to the actual time required for complete mercerization, he stated that there is some difference of opinion, the estimates ranging from thirty seconds to one minute. The mercerizing action increases as the strength of caustic is increased, and decreases with increase of temperature. In plants where all the wash water from mercerizing is recovered and used in the kiers, this is not of great importance, but where the recovered caustic is in excess of the needs of the bleach house, the total quantity required for mercerization can be often reduced by keeping the temperature down.

(To be concluded.)

CHANGES OF ADDRESS

Goldthwaite, Charles F.,
1107 North Fifty-ninth Avenue,
West Duluth, Minn.

Putnam, Philip C.,
Apponaug Finishing Company,
Apponaug, R. I.

Bailey, Sidney,
1103 Spruce Street,
Philadelphia, Pa.

Kidd, Thomas E.
Wilton, Me.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto

LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Advisory Editor

LAURANCE T. CLARK
Managing Editor

Published biweekly by
HOWES PUBLISHING CO., INC.
4109 Woolworth Building, New York City

A. P. HOWES, *President* E. S. PREDMORE, *Secretary*

Subscription price $5.00 per year; Canadian $5.50; foreign $6.00.

Vol. X January 16, 1922 No. 2

BRITISH DYE CONSUMERS AND THE LICENSING SYSTEM

IT is now a little more than a year since England passed her Dyestuffs Import Regulation Act, and during that time the various elements of the trade directly concerned with it have had ample opportunity to adjust themselves to the situation, which is to last ten years from the date of enactment. The British law, as is well known to the reader, is based on the licensing system, and since in this country we have been and shall continue to be subject to this system of dye import regulation until Congress can straighten out the tangle, it should be interesting to reflect for a moment upon the manner in which its restrictions and, in many cases, disadvantages—as compared with the proposed American system—have been ameliorated abroad.

The licensing system, as a possibility here, is dead. But because comparisons are constantly being made by those endeavoring to influence pending legislation, it has not yet entirely lost its rating as a controversial subject. When new schemes are suggested, they are usually measured against the licensing system because it is the existing one, and so serves as a standard for appraisal.

Of any system for safeguarding our dye industry, two questions may be asked, which, if answered satisfactorily, constitute an infallible test of desirability. These are:

1. Does it protect the dye industry sufficiently to guarantee its permanent existence in this country?

2. Does it interfere with the efficient conduct of the dye consumer's business to a point where he cannot offer the same competition to his foreign rivals that he could without it?

If the first question can be answered with a "yes" and the second with a "no," any system will do. There are literally hundreds of by-issues which can be raised, and which are constantly being raised. These serve only to becloud the situation. They may at times, and to certain individuals, seem to bear directly upon the main subject, but with such an instrument as the Sherman anti-trust law ready to be made use of, and ordinary native common sense, such fancied contingencies as the possible building up of a great dye octupus here, for instance, have little weight with the majority of us.

England will operate under the licensing system for nine years to come. Of this system it may be said that while it fulfills the first of the two above-mentioned conditions, it fails in the second respect unless administered with considerably more care and judgment than seems to be possible of attainment here.

Perhaps it would be better to say: . . . than any administrative body, Government or otherwise, seems to be willing to undertake to furnish.

At all events, the British, with characteristic thoroughness, have made the licensing system come nearer to fulfilling the second requirement than opponents of this system are willing to admit can be attained in America—which, after all, is the principal reason why we are now endeavoring to find a substitute equally well equipped with "teeth," but less fraught with "red tape."

The British law is administered by a Licensing Committee, and the Colour Users' Association began co-operating with this body as soon as the law was enacted, with pleasing results. This Association makes its influence felt through its Technical Advisory Committee, which endeavors to facilitate the procedure to obtain licenses for the importation of foreign dyestuffs by supplying the Licensing Committee with all the specific data necessary to the proper appreciation of the dye users' interests; and the Association has been instrumental in establishing two leading principles in the granting of licenses. These are: First, that the onus of proof of quality is placed upon the dye manufacturer; and second, as a *quid pro quo*, the onus of proof of price being unduly disadvantageous is upon the dye consumer.

With these as a nucleus, a working basis is at once established and cordial relations between consumers and the Licensing Committee are made easily possible. H. Sutcliffe Smith, President of the Society of Dyers & Colourists, and Chairman of the Dye Users' Association, recently pointed out that certain corollary principles had been mutually agreed to and indorsed by the Council of the Association which, if minutely adhered to, would tend to more expeditious considerations of applications for licenses to import, and would also assist the Association's nominees in supporting applications and seeing that licenses were granted where the necessity of importation had been established.

It is stated, for instance, that in cases where there is admittedly no British equivalent, licenses for reasonable quantities will be granted without challenge

—either to consumers or to dye agents. It is in cases where it is claimed that a British equivalent exists that delay may occur, and consumers are urged, therefore, to apply, whenever possible, in their own name for their requirements.

Among the reasons advanced for this request is the one already referred to, namely: that when a British-made dye is offered as an adequate substitute for a foreign one, it rests with the British manufacturer to prove that his product is actually a satisfactory equivalent.

As to the method of accomplishing such proof, *prima facie* evidence can be produced by laboratory tests, but finality can be achieved only when the manufacturer demonstrates the quality of his wares to the actual user, who must be satisfied that the proffered substitute will fulfill **all** the requirements of his particular trade. And, as the British view it, this is impossible if the user does not disclose his identity.

Right there we have an obstacle which prevents the licensing system—from the American standpoint, at least—from meeting the second requirement. The necessity for so much unwelcome publicity in connection with an order for foreign dyes of a certain kind would be extremely distasteful to the American consumer. And what is more, it would be neither fair nor even necessary to burden him with this penalty in order to protect our dye manufacturers. There are other ways of accomplishing the same end.

Mr. Smith's statement of principles further sets forth the contention that it cannot be too clearly impressed that unless the necessity of importing a foreign dye can be demonstrated, licenses to import cannot easily be obtained. Then it particularly emphasizes a point which alone would be enough to sound the death knell of licensing as a permanent institution in this country. It insists that applications for licenses should embody clearly defined reasons why importation is desired, and maintains that general statements, such as "This color is required because of its good dyeing qualities," are not regarded as effective.

The Council further indorses the principle that, wherever possible, the necessary qualities of the dyes should be specified, such as suitability for a particular process, solubility, fastness, shade, etc. In cases where British-made dyes have been tried as substitutes and have been found unsatisfactory, delay will often be avoided, under their system, if this is made known with a statement as to the respect in which the British dye is deficient, as to the date of trial, and as to whether or not the British manufacturer has been advised of its unsuitability.

Where an application has been refused, and the suggested substitute of British make has been found to be unsatisfactory, the consumer is urged to make a further application at once, stating as specifically as possible the shortcomings of the British color. In this connection, the Technical Advisory Committee of the Color Users' Association can be, it is declared, of material assistance in strengthening the claims for a license, and it is desired, therefore, that all such cases be reported to the Secretary of the Association.

When a difference in price between the British and the foreign dye operates to the serious disadvantage of the consumer, the latter is expected to accompany his application for a license by a statement demonstrating the extent to which he will be placed in a disadvantageous position by the refusal of a license.

Now, all this is not so very unreasonable, it will be granted, when one considers the inherent difficulties of administering a licensing law. But, reasonable or not, these requirements constitute the chief cause for the defeat of all attempts to get permanent license legislation here, and the chief reason why the sooner the present license system is done away with, and something less onerous to the consumer substituted therefor, the better it will be for both American consumer and manufacturer.

And out of all the substitutes which have been proposed so far, the selective embargo system now being considered by the special Congressional committee, while not perfect, comes nearer to fulfilling the two main requirements than any.

INTERNATIONAL BUSINESS AND THE EXCHANGE SITUATION

HELPFUL lessons for those interested in the settlement of the international dyestuff legislation situation may be found in the recent report on depreciated exchange issued by the U. S. Tariff Commission, inasmuch as the report considers present world exchange conditions from the standpoint of the degree of price and wage adjustments to a gold basis among the chief commercial countries, instead of the paper prices and wages in those countries.

These price studies take the form of (1) tables showing the value of foreign currencies compared with their value on the same date in terms of gold or American exchange, and (2) price comparisons, reduced to a gold basis, of a number of specific products in the various markets of the world. Briefly stated, the comparison by index numbers shows that after England and France in March, 1919, withdrew their governmental support of the exchanges, such exchanges quickly fell below their value in terms of domestic commodities for England and France. That is to say, the pound and franc thereafter were worth more in terms of English and French goods than they were worth in terms of gold.

This condition was favorable to an increase of imports from these countries to the United States. In 1921, however, paper prices in these countries, as measured by index numbers, had risen, relative to American prices, about as much as their exchange had fallen, with the result that there was no special inducement because of exchange rates for buying goods in England and France.

In the case of Germany, however, there is yet a great discrepancy between the internal value of the mark and its gold value. This was slightly more than 2 to 1 during the year just ended.

The prices of specific commodities in various countries tell, in general, the same story. The gold prices of copper, wheat and wool are about the same in the United States, England and France, with a lesser degree of adjustment for Germany. Therefore, except for daily fluctuations, the prevailing rates of exchange do not seriously disturb the trade in such products among the allied countries. Specialties, however, such as articles of fashion, or complicated chemical and metallurgical products, are often priced locally in Europe in terms of paper money, with the result that special bargains may be obtained by American buyers because of the low rates of exchange. This bonus on exports from central Europe is partly offset by the numerous restrictions to trade in exportable products, such as dyestuffs, among others, and indicates clearly what the situation would be with respect to such commodities were the restrictions removed or rendered less effective. This should be particularly noted by students of our own pending dyestuff legislation.

An interesting comparison of wages in the United States, England, France and Germany shows that they are less adjusted to a gold basis than are the prices. In May, 1921, the standard wage in Germany for factory workers was, roughly, 10 cents per hour in gold, as compared with 20 to 25 cents in France, 30 to 40 cents in England, and 50 to 75 cents in the United States. In the case of Germany, however, the gold value of wages is not as significant for some purposes as is the value in terms of commodities. Measured by wholesale prices in Germany, the wages quoted above were 16 to 18 cents per hour in May, 1921, and, expressed in terms of the worker's cost of living, they were 22 to 27 cents per hour for the various industrial centers.

The report indicates clearly that it would be difficult, although not absolutely impossible, to determine and administer offseting duties against exchange rates. A flat rate obviously could not be applied because of the varying degrees of depreciation of exchange in different countries, but a list of some commodities for which special protection is sought could be prepared and revised from time to time to meet changing conditions.

It is principally in the case of synthetic organic chemicals that almost insurmountable difficulties would be encountered by those attempting to work out such a system for the protection of our own industry, for, added to the conditions outlined above, we have to add the enormous advantages in the efficiency of manufacture enjoyed by the German dye manufacturer over his American would-be rival, and also the many methods of trickery for evading duties to which this industry peculiarly lends itself. In fact, this last factor alone would seem to be more than enough to preclude the regulation of German dye imports by a series of movable duties based on any list, "revised" or otherwise.

THE ENGLISH COLOUR INDEX

INTEREST in the efforts of the Society of Dyers and Colourists to prepare a Color Index in English which shall be international in scope and comprehensive in detail is steadily growing, and with the appearance of specimen pages in the November issue of the "Journal" of the Society, received an added impetus. The arrangement of the matter, which was arrived at after mature consideration by the committee under the chairmanship of Ernest Hickson, should insure the maximum amount of information in the minimum amount of space.

Progress in the work on this undertaking, which is considerable, is announced as satisfactory. The work of compilation was begun on September 1. The Index must, of necessity, bear a certain resemblance to other reference books of a similar type which have been published in the past, but in order to insure accuracy, every reference to patents, publications in scientific and technical literature, etc., has been traced back to its original source, verified, amplified—if necessary—and brought up to date; and about one-quarter of the entire Index (representing Index Numbers 1 to 300) has been collected, edited, and prepared for the press.

It is announced that the statement to the effect that the first of the twelve parts of the Color Index would be issued toward the end of the year must be somewhat revised, as there has been unexpected and unavoidable delay in the preparation of the column dealing with the commercial names of dyes—a most intricate and confusing subject! It is an excellent augury for the ultimate success of the enterprise, however, that the great majority of the leading dye manufacturers have promised active support, agreeing to supply the necessary information. Some little time, nevertheless, must elapse before all this can reach the compilers, particularly in the case of manufacturers outside of England.

To insure greater accuracy, it is planned to submit proofs for correction or amplification to a thoroughly competent Revision Committee, as well as to each firm of dye manufacturers whose products are dealt with in the Index; and, as before stated in these columns, the high standing and unquestionable authority of those engaged in directing this venture place its worth beyond all doubt.

Once again, all American dye manufacturers are urged to offer and render all possible aid to the compilers of this Index. If any American manufacturers have not as yet sent complete information regarding their various products to the committee, they should do so immediately. Communications should be addressed to Ernest Hickson, Chairman Committee on Colour Index, Society of Dyers & Colourists, Pearl Assurance Building, Market Street, Bradford, England.

FOREIGN DYES LICENSED BY TREASURY DEPARTMENT FOR DECEMBER IMPORT

(*Continued from page* 48.)

Designation of Dye	Germany (lbs.)	Switz. (lbs.)
Aliz. Fast Blue BHG	50	....
Aliz. Green S 15% Paste (from England 1,500 lbs.)	....	....
Aliz. Orange A	100	....
Aliz. Red (Yellow Shade) (from England 4,910 lbs.)	....	....
Aliz. Red S Powder (from England 1,000 lbs.)	....	....
Aliz. Red SDG	50	....
Aliz. Red SX 20% Paste (from England 500 lbs.)	....	....
Aliz. Rubinol R	1,150	....
Aliz. Rubinole R Powder	220	....
Aliz. Saphirole B	4,200	....
Aliz. Saphirole SE	600	....
Aliz. Saphirole SE Powder	300	....
Aliz. Saphirole WSA	300	....
Aliz. Saphirole WSA Powder	500	....
Aliz. Sky Blue B	500	....
Anthracene Blue SWGG Ex. Powder	50	....
Anthracene Brown EB	200	....
Anthraflavone GC Paste	1,600	....
Anthraquinone Blue SR Ex. Powder	50	....
Anthraquinone Violet Powder	50	....
Autol Orange 23211	1	....
Benzo Chrome Black Blue B	200	....
Benzo Chrome Brown 5G	1,500	....
Benzo Fast Blue B	100	....
Benzo Fast Blue 4GL	441	....
Benzo Fast Red 8BL	3,000	....
Benzo Light Brown GL	1,000	....
Benzo Red 12B	1,250	....
Bismarck Brown 47	100	....
Blue Lake	500	....
Bluelake 42D	200	....
Bluelake 1028K	100	....
Bluelake 1627H	50	....
Bluelake 14228	500	....
Brilliant Benzo Green B	400	....
Brilliant Indigo 4G	100	....
Brilliant Milling Blue B	100	....
Brilliant Sky Blue 5G	1,000	....
Brilliant Sky Blue 8G Extra	4,150	....
Brilliant Sky Blue 2RM	4,000	....
Brilliant Violet 2B Powder	100	....
Canelle ALX	5	....
Carmin 1762H	10	....
Carmine 2682Z	100	....
Chicago Red 111	....	500
Chinoline Yellow KT Ex. Conc	25	....
Chinoline Yellow, soluble in spirits	2	....
Chinoline Yellow XT Ex. Conc	100	....
Chloramine Red SES	1,000	....
Chlorantine Fast Black B	....	440
Chlorantine Fast Blue 2GL	....	4,785
Chlorantine Fast Blue RL	....	6,490
Chlorantine Fast Bordeaux 2BL	....	550
Chlorantine Fast Violet BL	....	330
Chlorantine Fast Violet 4BL	....	1,034
Chlorantine Fast Yellow 4GL	....	330
Chlorantine Fast Yellow RL	....	1,980
Chromazurine P Powder	....	1,100
Chrome Brown TY	....	660
Chrome Printing Red Y Powder	....	100
Chrome Violet VM Paste	5	....
Ciba Blue 2B Powder	....	1,050
Ciba Blue 2BD Paste	....	13,200
Ciba Blue G Powder	....	24
Ciba Green G Paste	....	1,540
Ciba Orange G 10% Paste	....	330
Ciba Pink BG Paste	....	1,100
Ciba Pink BG Powder	....	770
Ciba Red R Powder	....	275
Ciba Red R Paste	....	880
Ciba Scarlet G 20%	....	2,640
Ciba Scarlet G Paste	....	2,761
Ciba Scarlet G 20% Paste	....	5,280
Ciba Scarlet G Ex. Powder	....	254
Ciba Violet B Paste	....	9,900
Ciba Violet R Paste or Powder	....	1,100
Ciba Violet R Paste	....	5,500
Ciba Violet R Powder	....	270
Cibanone Brown B Paste 20%	....	880
Cibanone Brown B Powder	....	440
Cibanone Brown R	....	2,640
Cibanone Orange R	....	110
Cibanone Orange R Paste	....	1,000
Cibanone Orange R Powder	....	120
Cibanone Yellow R Powder	....	154
Cloth Fast Brown 2R	....	220
Cloth Fast Orange R	....	220
Cloth Fast Violet R	....	55
Cloth Fast Yellow 5G	....	275
Congo Fast Blue B	190	....
Cross Dye Green B (from England 2,240 pounds)	....	....
Cross Dye Green 2G Conc. (from England 16,450 pounds)	....	....
Crystal Violet Ex	600	....
Cyananthrol BGAOO	500	....
Cyananthrol BGAOO 100%	500	....
Cyanole Extra	235	....
Cyanole FF	220	....
Deep Black 6 Paste	5	....
Developer B	260	....
Developer Z	420	....
Diamine Brown 3G	150	....
Diamine Catechine B	....	660
Diamine Catechine G	100	....
Diamine Fast Blue CG	3,000	....

Designation of Dye	Germany (lbs.)	Switz. (lbs.)
Diamine Fast Blue FFB	3,000	....
Diamine Fast Bordeaux 6BS	3,000	....
Diamine Fast Brown GB	3,000	....
Diamine Fast Orange ER	3,000	....
Diamine Fast Violet FFR	3,000	....
Diamine Orange B	200	....
Diamine Yellow N 110%	330	....
Diaminogene Blue NA	3,500	....
Dianil Brown 3GO	500	....
Diazo Brilliant Black B	1,000	....
Diazo Brilliant Scarlet B Extra	50	....
Diazo Brilliant Scarlet G Ex. Index.	50	....
Diazo Brown 3G	574	....
Diazo Fast Blue 2BW	....	660
Diazo Fast Green GF	100	....
Diazo Fast Green 3G	100	....
Diazo Fast Violet BL	250	....
Diazo Fast Yellow 2G	100	....
Diazo Sky Blue B	1,000	....
Diphene Blue R	100	....
Diphenyl Fast Brown GNC	....	500
Diphenyl Fast Gray BC	....	500
Erika B Extra	620	....
Erio Chrome Azurol BX	....	500
Erio Chrome Azurol BX Conc	300 gms.	....
Erio Chrome Blue S	....	1,000
Erio Chrome Brown R	....	1,000
Erio Chrome Brown ROS	....	1,000
Erio Chrome Flavine A Conc	....	1,000
Erio Chrome Geranol R Conc	....	110
Erio Chrome Phosphine R	....	500
Erio Chrome Verdon S	....	940
Erio Chrome Yellow 6G	....	1,000
Euchrysine GRNTX	25	....
Fast Green Bluish	500	....
Fast Green Extra Bluish	100	....
Fast Light Green	5	....
Fast Light Yellow 3G	600	....
Fast Mordant Yellow G	50	....
Fastigen B	100	....
Fuscamine	5	....
Gallamine Blue Extra Paste	....	2,000
Hansa Yellow G	100	....
Hansa Yellow 5G Lumps	50	....
Helindone Golden Orange IRRT Pst.	1,000	....
Helindone Pink AX	1,920	....
Helindone Pink AX Paste	1,370	....
Helindone Pink BX	500	....
Helindone Pink BX 10%	70	....
Helindone Pink BX Paste	650	....
Helindone Pink BX Powder	50	....
Helindone Violet R Paste	500	....
Hortensia Lake	200	....
Hydron Blue G Powder	100	....
Hydron Blue R Powder	2,200	....
Indanthrene GP Powder	25	....
Indanthrene Blue BCS	10,035	....
Indan. Blue BCS Powder	15,525	....
Indan. Blue GCD Double Paste	25	....
Indan. Blue GGSXP Powder, quintuple	40	....
Indan. Blue 3G	11,000	....
Indan. Blue WBO	100	....
Indan. Golden Orange G Dble. Paste	1,000	....
Indan. Golden Orange G Powder	150	....
Indan. Golden Orange RRT Paste	50	....
Indan. Golden Orange RRT Paste, Sand Free	2,500	....
Indan. Golden Orange 3R	500	....
Indan. Golden Orange 3R Paste	1,000	....
Indan. Pink BS Powder	25	....
Indan. Pink R Double Paste	50	....
Indan. Red BN Extra Paste	500	....
Indan. Red Violet RRN	720	....
Indan. Violet BN Extra Paste	2,500	....
Indan. Violet RR Ex Paste	300	....
Indochrome T	....	550
Indigene Blue BB Paste	....	22
Ink Blue BITBNOO	2,200	....
Katanol	5	....
Kiton Fast Red S	....	1,100
Kiton Pure Blue V	....	1,980
Lanasol Brown 2R Pat	....	220
Lithol Fast Yellow GG Ex. Lumps	200	....
Madder Lake (from Scotland 2,000 lbs.)	....	....
Madderlake 71	25	....
Madderlake 71 Extra	100	....
Madderlake VX	750	....
Madderlake VX14	1,000	....
Methyl Lyons Blue	....	3,000
Methylene Green G	....	550
Milling Yellow O	1,000	....
Mounsey Olive Brown G Powder (from England 500 lbs.)	....	....
Naphthalene Green V	500	....
Naphtogene Indigo Blue B	25	....
Naphthylamine Brown	5	....
Night Blue	10	....
Nitrosamine Red Paste	1,000	....
Paris Green Extra Yellowish	100	....
Paste Dryer M	10	....
Patent Blue A	700	....
Patent Blue A (Special)	1,000	....
Patent Marine Blue LE	31,450	....
Patent Phosphine M	....	550
Patent Phosphine R	....	110
Peacock Blue	2,320	....
Peacock Blue 198N	100	....
Peacock Blue 315BK	520	....
Peacock Blue 315PK	500	....
Peacock Blue 14228	250	....
Peacock Blue Lake	250	....
Peacock Blue Lake 14228	250	....

Designation of Dye	Germany (lbs.)	Switz. (lbs.)
Philchromin B Paste	5	....
Phloxine Lake 1	1,000	....
Phosphine	310	....
Phosphine G 300%	....	220
Phosphine 3R	100	....
Pink Color (Aniline Dye)	20	....
Polar Red G Conc	....	1,000
Polar Red R Conc	....	110
Polar Red RS Conc	....	110
Pyrogene Cutch 2R Extra	....	1,444
Pyrogene Cutch Brown RR	....	1,100
Pyrogene Direct Blue RL	....	275
Pyrogene Green 3G Conc. 270%	....	176
Pyrogene Yellow Brown NRS	....	242
Pyrogene Yellow Brown RS	....	1,244
Pyrogene Yellow M	....	4,400
Pyrogene Yellow G	....	4,400
Reflex Blue OO Lithol Quick Drying	25	....
Rhodamine 6GDX Extra	1,125	....
Rosanthrene B	....	660
Rosanthrene Bordeaux B	....	1,100
Rosanthrene Orange R	....	990
Rosanthrene Orange R Pat	....	55
Rosanthrene R	....	770
Rosanthrene Rose	....	880
Rubinlake	25	....
Saba Phosphine M Conc. (Patent)	....	1,100
Salicine Orange 2R	100	....
Seiden Schwarz 4BF	2,200	....
Silk Blue BTBOO	440	....
Solamine Blue EF	500	....
Solidred 7441H	200	....
Solidred 8809	200	....
Soluble Blue Crystals	600	....
Sorbin Red X	1,000	....
Tetra Cyanole	485	....
Thio Indigo Pink AX	220	....
Thio Indigo Pink BX	220	....
Thio Indigo Rose BX Paste	400	....
Thionol Brown GD (from England 1,000 lbs.)	....	....
Thionol Brown O (from England 8,000 lbs.)	....	....
Thionone Isabellina (from England 100 lbs.)	....	....
Triazol Red B	....	440
Trisulfon Brown B	....	2,000
Trifulson Brown GG or 2G	..	2,000
Ursol Gray B	50	....
Viridin Lake 1026H	200	....
Viridin Lake 1027H	100	....
Viridin Lake 1028H	100	....
Wool Black GR	500	....
Xylene Cyanole FF Conc	....	1,000
Xylene Fast Green B Conc	....	1,000
Xylene Red B Conc	....	500

Designation of Dye	Germany (lbs.)	Switz. (lbs.)
Totals:		
Germany		149,265
England		38,720
Switzerland		120,702
Grand Total		308,787

DU PONT ANNOUNCES PONTACYL LIGHT YELLOW GG, PONTAMINE ORANGE 4G AND PONTAMINE YELLOW GR

The Dyestuffs Department, Sales Division, E. I. du Pont de Nemours & Co., announces placing the following new products on the market:

Pontacyl Light Yellow GG, which is like pre-war Fast Light Yellow G, which is well known on account of its fastness to light and excellent level dyeing properties.

Pontamine Orange 4G, which is a Direct Orange. It is of considerably yellower shade than Pontamine Orange R, previously marketed by the du Pont Company. This product possesses general good fastness, good solubility and good level dyeing properties. The fastness to washing, light and acid, rubbing, perspiration and chlorine is good. Alkali tends to change the shade redder, but after a thorough washing the redness disappears and the shade becomes normal again. It cannot be discharged. This product is suitable for cotton in all stages of manufacture, and leaves silk and wool white when dyed from a neutral bath, for which reason it should be of interest to makers of union goods as a color suitable for dyeing the cotton after the wool has been dyed. Because of this property it should also find use in the production of two-tone effects and for spec dyeing. It is not fast to cross-dyeing.

Pontamine Yellow GR. This Direct Yellow is redder in shade than Pontamine Yellow SX, now being sold by the du Pont Company. It possesses good solubility and level dyeing properties. In fastness it has the same qualifications as the Pontamine Orange 4G mentioned above. As is the case with the Pontamine Orange 4G, the shade turns reddish with the use of alkali, but returns to the original shade after a thorough washing. The product cannot be discharged and is not suitable for cross-dyeing. After-treatment with metallic salts does not improve the fastness.

Announcement has been made by the Chester Chemical Corporation, New York City, to the effect that the capital of this concern has been increased from $10,000 to $20,000.

Announcement has been made by C. Bischoff & Co., New York City, to the effect that the name of this company has been changed to the Carbic Color & Chemical Company.

CHINESE NOW TRYING TO DEVELOP OWN CHEMICAL INDUSTRY

"Made in China" Movement Spreading to All Parts of the Republic and Factories Are Being Established for the Manufacture of Crude Chemicals—An Experience with a "Dye" Factory

China and other countries of the Orient are developing chemical industries as a result of the movement started by the World War. Although, according to William Henry Adolph, of Shantung University, China, writing in the "Journal of Industrial and Engineering Chemistry," America is much admired by the Chinese industrialists, the United States has not risen to the commercial opportunities offered.

"America," he continues, "may well take a lesson from Germany's methods in stimulating chemical industry in Shantung. Her expert studied the industrial needs of the province, designed machinery and plant of a type which was not used in Germany but which was needed in China. Our American houses too often have sent their catalogues and given up in despair when an order was not received by return mail. But the Germans cultivated the market, then patiently waited, taught, established industrial schools, were patient again, and built themselves into the good graces of the people. Even now the field is still a virgin field, and it requires expensive and rather tender cultivation on the part of the industrialist and commercial man. An enterprising peanut-oil producer knows perhaps how to run an oil press, but is unable often without help to order the machine he needs from the confusing specifications of an American catalogue, and to install it.

"Americans traveling in China are astonished at the extent to which intelligent Chinese are looking to America as the source of new inspiration and help. In traveling through China the writer found the simple statement that he was an American the most powerful passwood that could have been given. He was still more interested in observing the care with which his Chinese associate on industrial trips mentioned that the foreign visitor was an American. It invariably meant the doors were thrown open with a willingness. This was in spite of the fact that the Chinese manufacturer has preserved a good bit of his medieval reticence, and is cautious about imparting family trade secrets.

"The situation in China divides itself into the recognition of two kinds of industries, with two kinds of industrial problems. In the first place are the old Chinese chemical industries, dyeing, glass, paper, etc., which had their origin in China's prehistoric days. In the second place are the chemical industries which are new to China, sulphuric acid, soda, tanning which are now looked upon as the foundation stones of a modern chemical industry.

"The first, the old industries, will help fill some of the pages of our history of chemical industry, and will furnish some of the curious illustrations of how practice can race away from theory till theory is lost thousands of years behind. In China these were all small-scale industries, many of them family industries, and in most cases only supplementary to various phases of agriculture. They require a development that will enable them to retain their important position in the economic fabric of the country, and at the same time to satisfy the requirements of modern efficiency. The second, the new industries, involve serious financial problems as well as technical ones.

"The 'made-in-China' cry which accompanied the recent patriotic movement has taken a real place in the life of the country, and it has not turned out to be but a fleeting enthusiasm. High-school graduates, and ex-soldiers whose experience has been limited to the manufacture of soda-water and vending of opium pills, have set up as chemical manufacturers, and the desire to *make*, instead of *import*, will gradually affect the status of our commercial relationship with China.

"News came to us recently of a newly founded sulphuric acid plant in central Shantung, where pyrite was plentiful and fuel cheap; they were reported to be in difficulty. On arrival, our surprise was exceeded only by a certain amount of pathetic admiration. A couple of thousand dollars, all the money the investors possessed, had been expended in the erection of a small plant for the manufacture of sulphuric acid by the chamber process. There were four little lead chambers in a row, a pyrite burner was located at one end and at the other end was an outlet pipe for the excess gases. The manager, who was a high-school graduate and had studied a half-year of chemistry in high school, stepped proudly forward and explained that he had designed the plant unaided and that the completed plant was an exact copy of the diagrammatic sketch which was to be found in his high-school textbook. The plant had failed to produce satisfactory acid. The 'company' was profoundly disappointed when shown that there were a number of important details which had been omitted in the crude sketch. This is not an isolated case of patriotic enthusiasm.

"The 'made-in-China' movement also manifested itself in other ways. A short time ago there was erected a high and imposing chimney, with the elements of a factory attached to its base. In a few days the chimney started spurting heavy nitric fumes, and simultaneously with the appearance of the fumes there were scattered broadcast over the Chinese republic handbills announcing the founding of a Chinese company for the manufacture of synthetic dyes in China to replace the imported variety. Patriotic Chinese dyers responded with enthusiasm; the new made-in-China dyes prospered with alacrity. The factory became the center of some interest, but visitors were not encouraged. An investigation showed that there were two doors in the factory. Into the east door were hauled on high single-wheeled barrows cases of imported dyestuffs. On the trip through the factory the cases were

opened, labels removed and changed for made-in-China labels, and the dyes were wheeled out the west door to parade as Chinese product. The yellow smudge which appeared from the stack was kept going constantly, while the process of pasting on new labels proceeded."

MOUREU PREDICTS BRIGHT FUTURE FOR AMERICAN CHEMISTRY

American chemistry has a brilliant future, in the opinion of Professor Moureu, President of the International Union of Pure and Applied Science, who was recently the guest of honor at a dinner at the Chemists Club, 52 East Forty-first Street, New York City, given by the American Section of the *Societe de Chimie Industrielle*.

Professor Moureu is in this country as one of the advisers on chemical warfare to the French delegation at the Disarmament Conference, and is in touch with large scale chemical operations in Europe. In replying to an address of welcome he said that he was much impressed by the many chemical activities of the United States. He predicted that this country would soon be a leading nation in chemical industry, and thus give a guarantee of peace.

In addition to his official mission here, he will also visit American institutions where he will speak on organic chemistry, of which branch of science he is a professor at the *College de France* in Paris. The French savant spoke at Columbia University on "The Natural Gases with Especial Reference to Rare Gases."

Joining with the American branch of the French society in extending a greeting to Professor Moureu were the New York Section of the American Chemical Society, represented by Professor Ralph H. McKee, of Columbia University, and the American Section of the Society of Chemical Industry, by S. R. Church, chairman; Charles A. Doremus, former president of the American Electrochemical Society's New York Section. Professor J. Enrique Zanetti, president of the American Section of the *Societe de Chimie Industrielle*, presided.

Among the guests were Professor Marston T. Bogert of Columbia University, Dr. William H. Nichols, head of the Allied Drug & Chemical Corporation and formerly president of the American Chemical Society; Dr. Charles H. Herty, president of the Synthetic Organic Chemical Manufacturers Association of the United States; Henry Blum, Ellwood Hendrick; Dr. George F. Kunz, Dr. Leo H. Bakeland, honorary professor of engineering chemistry, Columbia University, and Dr. Charles Baskerville, vice-president; J. V. N. Dorr, treasurer, and Professor Arthur W. Thomas, secretary of the American Section of the *Societe de Chimie Industrielle*.

The Mallinckrodt Chemical Works, Ltd., of Canada, has just purchased the property in the heart of the wholesale and manufacturing center of Montreal, situated at 468 to 482 St. Paul Street West. The building is a modern five-story and basement structure containing over 40,000 square feet of floor space.

SCIENCE AND COTTON

Whenever a great movement is started, such as the Institution of the Cotton Industry Research Association, there are always skeptics to be found who question its practical value and demand to know what good research will be to practical spinning and weaving. Whether it was his intention or no, such doubters were given a complete answer by Dr. A. W. Crossley in an address given to the National Federation of Textile Works Managers' Associations on "The Co-operation of Industry and Science." Since science could not prevent loss from lack of knowledge, said Dr. Crossley, people in industry ought to pay for scientific research as readily as they paid for fire insurance. They might ask him what it was going to do for the cotton industry. Well, it could not do for the cotton industry what it did for the coal-tar color industry, because in the latter case science started a new industry and no one would suggest that the cotton industry was new. But the Research Association had founded the Shirley Institute at Didsbury, where it was building laboratories. The laboratories would be devoted to four departments of work: physics, chemistry, botany, and colloids. A program of research had already been outlined, but many of the problems must be referred back to the nature of the single cotton hair itself. The program included problems relating to the establishment of the various properties of the raw materials; problems relating to special branches of the industry, such as spinning and weaving; problems concerning the development of accurate methods of testing yarns and ascertaining length of staple, temper and extensibility; the effect of temperature and humidity; problems relating to sizing and the effect of sizing in the production of hard and soft warps; the effect of steam on cotton, because of the bearing of this upon dyeing and finishing; and problems of a like nature. The Shirley Institute had been established primarily for research—for the creation of new knowledge. It would certainly not put aside any practical problems which the industry wanted solving, but the main object was to strike out on new lines, to accumulate new knowledge, which would mean new processes or better processes. But the scientist could not take the place of the works expert. Life was not long enough for a man to become an expert in the works and a scientific expert at the same time. Therefore, co-operation between the two was the only way which would lead to success in the future. The main difficulty he had to encounter was to know what the practical men thought about certain problems and to ascertain what were their difficulties. He suggested that two or three members of the Managers' Federation should consider the problems of spinning, others the problems of weaving, others the problems as to sizing, and so on. They could then draw up a list of questions that needed investigation, and such a list would be of the greatest assistance to him in arranging the work to be done at the Institute.

First Complete Translation of Japan's Drug and Dyestuff Protection Legislation Issued by U. S. Commerce Department

Translated by Commercial Attache James F. Abbott from Documents Copied in the Original Japanese by Colonel Baldwin

FOR the first time in this country a complete translation of Japan's existing legislation designed to foster and protect its chemical industry, especially dyestuffs, is now available through the U. S. Bureau of Foreign and Domestic Commerce, Department of Commerce, in the form of a translation by Commercial Attache James F. Abbott from documents copied in the original Japanese by Colonel Baldwin. The complete text of such legislation in English should be of great value to the American dye industry, and is herewith presentend in this issue by The REPORTER.

Dr. Abbott states that he is in doubt as to the exact meaning of certain clauses referring to the methods by which accounts are to be kept, but gives it as his opinion that the excess profits and reserve funds to which the clauses refer are not likely to be called into existence in the immediate future, and for that reason are, at the time, of academic interest only.

Dr. Abbott's translation follows in its entirety:

LAW FOR THE ENCOURAGEMENT OF THE MANUFACTURE OF DYES AND DRUGS
(Act of June 21, 1915)

Section 19

Article 1. Under the designation "Dyes" in this law are included ("Anilinsorte") (Anilin) dyes; (Alizarin) dyes, and artificial Indigo. Under the term "Drugs" will be included such drugs as may be designated by Imperial Ordinance.

Article 2. Joint-stock companies, organized according to the laws of the Empire, more than 50 per cent of whose capital and more than half of the control is held by Japanese subjects, which companies are engaged in carrying on in Japan the business of manufacturing drugs and dyes, on and after the date of the promulgation of this law may be granted a subsidy.

Article 3. The appointment of this subvention shall be such as to produce a dividend of 8 per cent per annum on the total paid in capital for each fiscal year. The method of calculating this dividend and of paying out this subsidy shall be determined by Imperial Ordinance.

Article 4. The company may not declare a dividend without the sanction of the Cabinet Minister concerned.

Article 5. So long as such companies are recipients of this subsidy the Cabinet Minister concerned shall have power to supervise the business and may issue appropriate instructions for that purpose and furthermore is empowered to take over the management.

Article 6. Should such a company contravene the orders of the Cabinet Minister concerned or not follow his instructions regarding management the latter shall be empowered to withhold part or all of the subsidy.

Article 7. Should any company secure a subsidy by fraud, it shall be penalized an amount equal to the subsidy.

The penalties mentioned in the foregoing article may be collected under the regulations in force for the collection of delinquent taxes, provided that the status of any special rights previously held in respect of taxes shall be preserved.

Article 8. Besides dyes and drugs, in cases where chemicals and perfumes are manufactured using as a base the mother liquor resulting from the dry distillation of coal, such as may be designated by Imperial Ordinance, these shall be considered as "dyes and drugs."

Article 9. Raw materials for the manufacture of explosives designated by Imperial Ordinance are to be considered also as drugs and dyes.

The date of the enforcement of this law shall be determined by Imperial Ordinance. (Same was promulgated by Imperial Ordinance No. 182, October 15, 1915.)

Amendment (Ordinance No. 224, 1916.)

Article 1. The following shall be designated as the "drugs" referred to in Article 1:

(A) Acetanilid
Benzoic acid
Phenol
Antipyrine
Bromine
Chloral hydrate
Chloroform
Cresole
Formaline
Glycerine
Guiacol (?)
Potassium hydrate
Creosote
(B) Alkaloids
(C) Derivatives and combinations of (B)

Article 2. The coal-tar derivatives mentioned in Article 8 shall be designated as follows:

Crude and refined glycerol (?)
Crude carbolic acid
Crude and refined naphthaline
Crude and refined anthracine

Article 3. The raw materials for explosives mentioned in Article 9 shall be designated as follows:

Phenol
Glycerine

Article 4. With regard to the dividends to be declared in connection with the law for the encouragement of the manufacture of dyes and drugs, the Government sudsidy and the profit and loss account carried over from the previous fiscal year shall not be included in the profit account. The reserve fund calculated according to Article 5 of these regulations shall be subtracted from this amount and held as a reserve.

Article 5. With regard to the loss from the preceding fiscal year included in the Government subsidy and the profit from the preceding fiscal year not so included, should there be any other profit, one-twentieth of it shall be set aside as a reserve fund and included in the account for each fiscal year.

Should the company issue shares at a face value above par, such excess value shall also be added to this reserve fund.

The reserve fund described in the two paragraphs above shall not exceed one-quarter of the total capital.

Article 6. With respect to the amounts excluded from the subsidy up to the amount of the reserve fund, according to the preceding article, the Government subsidy and the loss carried over to the profit account from the profit and loss account of the preceding fiscal year shall not be considered to be a loss arising in respect of such excluded amounts of subsidy.

Article 7. From the profit included in the profit and loss account carried over from the preceding fiscal year, the reserve fund calculated according to Article 5 is to be deducted. If the balance exceed 8 per cent per annum of the paid-in capital stock, half of such balance shall be set aside as a special reserve. When the above balance does not exceed 4 per cent of the paid-in capital stock the whole amount shall be set aside as a special reserve fund.

As for the accumulated special reserve fund calculated according to the two paragraphs above, the loss included in the profit and loss account carried over from the preceding fiscal year shall be made up and only the profit to be estimated according to Article 4 of the regulations up to the amount of 8 per cent of the paid-in capital stock of the company shall be included in the financial statement.

Article 8. The subsidy must be entered as an asset when financial statements are rendered, provided that in the discretion of the Cabinet Minister concerned such funds may be utilized for the purpose of carrying on the business.

Article 9. In calculating the amount of the subsidy the quotation of paid-in shares on the day they are registered shall be taken as their value.

Article 10. Losses arising through malfeasance of managers, auditors or other executive officials of the company which may alter the amount of the profit and loss account shall not be considered in the calculation of the subsidy which must be estimated on profit and loss arising directly out of the conduct of the business. The same shall obtain with regard to loss on account of failure to follow instructions of competent Government officials.

Article 11. The subsidy account may be opened or closed at any time within the limits of the fiscal year. In estimating the amount of this fund under such circumstances the profit and loss account shall be pro-rated in the same ratio to the amount of the paid-in capital stock for the period under consideration.

Article 12. Should the subsidy account be opened within the period of the first fiscal year, and should the amount of such subsidy for that year be inadequate to make up for the loss arising out of the business of that fiscal year then such loss shall be carried over to the profit and loss account of the following fiscal year.

Supplementary Rule

This Ordinance shall go into effect on and after the day of the promulgation of the "Law for the Encouragement of the Manufacture of Dyes and Drugs."

Rules for the Carrying Out of the Provisions of the "Law for the Encouragement of the Manufacture of Dyes and Drugs"

(Ordinance of the Department of Agriculture and Commerce, No. 214, October 14, 1915)

Article 1. Joint-stock companies receiving a subsidy under the provisions of the "Law for the Encouragement of the Manufacture of Dyes and Drugs" must have a capital, in the case of dyestuff manufacturers, of 6,000,000 yen or more, in the case of manufacturers of the raw materials of explosives, of 1,200,000 yen or more.

Article 2. Promoters of companies which are to receive such a subsidy must secure the permission of the Minister of Agriculture and Commerce before stock subscriptions are opened and must supply the following information:

1. By-laws of the company.
2. Number of shares taken up by each promoter.
3. Method of soliciting stock subscriptions and of allotment of shares.
4. Amount to be paid in on the first call.
5. Projected location of factory; details of equipment and anticipated date of completion.

6. Anticipated date of beginning operations.
7. Program of operations for the first fiscal year and tentative budget of receipts and disbursements.
8. The kinds of dyestuffs which it is planned to manufacture during the period of the subsidy, the estimated amount to be produced, of raw materials required and similar details of the business.

Article 3. Since shareholders in such companies must be Japanese subjects, in order that permission to incorporate may be secured, it is necessary that the by-laws shall include a rule to the effect that such shares must not be transferred or hypothecated to those who are not Japanese subjects.

Article 4. Companies are forbidden to issue shares except in the name of an individual.

Article 5. The amount of the capital remaining after deducting the overhead and the cost of manufacturing shall be used for continuing the business. The pro-rata of deduction referred to in the preceding paragraph must have the prior approval of the Minister of Agriculture and Commerce.

The Minister of Agriculture and Commerce has power to change this pro-rata.

Article 6. Application for subsidy must be made at the time articles of incorporation are filed. The foregoing application shall contain the by-laws, a transcript of the articles of incorporation, a statement of resources; of liabilities; a list of shareholders and the minutes of the first organization meeting.

Article 7. Permission of the Minister of Agriculture and Commerce must be secured for changes of the by-laws, of the directors or auditors through election or resignation, flotation of new shares, dissolution or consolidation with other companies.

Article 8. Permission must be secured of the Minister of Agriculture and Commerce for issuing a second call or subsequent calls on the unpaid-in capital stock.

Article 9. A tentative financial statement for each fiscal year and an account of receipts and disbursements must be rendered the Minister of Agriculture and Commerce by the beginning of the second month of the following fiscal year, and his approval secured for the same.

Article 10. Permission must be secured of the Minister of Agriculture and Commerce for extensions of the factory or of other equipment, purchase of land or other transfers.

Article 11. A statement must be rendered the Minister of Agriculture and Commerce by the twentieth of each month of the production and accounting for the previous month.

Article 12. A statement must be rendered the Minister of Agriculture and Commerce prior to the fixed general meeting of the shareholders of the company containing an account of assets and liabilities; of the condition of the business; profit and loss account; statement of receipts and disbursements and list of shareholders in the company.

Article 13. The Minister of Agriculture and Commerce may demand at any time an accounting of the business condition of the company and a statement of its assets, may order an investigation of its books or require a general meeting of the shareholders to be called.

Article 14. Should any transactions of the company of its directors or auditors contravene the by-laws of the corporation or be prejudicial to the public interest the Minister of Agriculture and Commerce may void them and require the resignation of auditors and directors. He may also do the same should auditors and directors fail to carry out his directions.

Supplementary Rule

The above regulations shall be in effect on and after the day of the promulgation of the "Law for the Encouragement of the Manufacture of Dyes and Drugs."

Rules for Carrying Out the Provisions of the "Law for the Encouragement of the Manufacture of Drugs and Dyes"

(Home Department Ordinance No. 13, October 14, 1918)

The following regulations shall be enforced in connection with the "Law for the Encouragement of the Manufacture of Drugs and Dyes."

Article 1. Companies receiving a subsidy under the provisions of the "Law for the Encouragement of the Manufacture of Drugs and Dyes" must have a capital of at least 500,000 yen.

Article 2. Promoters of companies that anticipate asking for such a subsidy must first secure the permission of the Home Minister before opening subscriptions for stock and must supply the following information:

1. By-laws.
2. The number of shares to be held by each promoter.
3. The method proposed for soliciting stock subscriptions and for the apportioning of the shares.
4. The amount to be paid in on the first call.
5. The proposed site of the factory; details of the equipment; and the period during which it is expected to be completed.
6. Time at which it is proposed to begin production.
7. Program of operations and proposed budget for the first fiscal year.
8. The kinds of drugs and dyes it is proposed to manufacture during the period in which the subsidy is asked, the proposed cost of manufacture, the raw materials to be employed and other details of the business.

Article 3. Since shareholders in such companies must be Japanese subjects, in order that permission to incorporate may be secured, it is necessary that the by-laws shall include a rule to the effect that such shares must not be transferred or hypothecated to those who are not Japanese subjects.

Article 4. Companies are forbidden to issue shares except they be registered in the name of an individual.

Article 5. The amount of the capital remaining after deducting the deficit due to the overhead and the cost of operation is to be used for continuing the business. The pro-rata of deduction referred to in the preceding paragraph must have the prior approval of the Minister of Home Affairs.

The Minister of Home Affairs has been authorized to change this pro-rata.

Article 6. The company must apply for the subsidy at the time its articles of incorporation are registered. There must be attached to the application for registration the by-laws of the company; a transcript of the articles of incorporation; a list of assets; statements of obligations; list of shareholders, and the minutes of the first organization meeting.

Article 7. Permission must be secured from the Minister of Home Affairs for any change in the by-laws of the company; election or resignation of managing directors or auditors; flotation of new shares, consolidation with other companies or dissolution.

Article 8. Permission must be secured of the Minister of Home Affairs for issuing the call for second and subsequent calls on the unpaid-in capital stock.

Article 9. A tentative financial statement for each fiscal year and an account of receipts and disbursements must be rendered the Minister of Home Affairs by the beginning of the second month of the following fiscal year; likewise any subsequent alterations in such statements must be rendered the same official.

Article 10. Permission must be secured of the Minister of Home Affairs for extensions of the factory or of other equipment, purchase of land or other transfers.

Article 11. A statement must be rendered to the Minister of Home Affairs by the twentieth of each month of the production and accounting of the preceding month.

Article 12. A statement must be rendered to the Minister of Home Affairs prior to any general meeting of shareholders of the company, containing an account of assets and liabilities; of the condition of the business; profit and loss account; statement of receipts and disbursements and list of shareholders in the company.

Article 13. The Minister of Home Affairs may demand at any time an accounting of the whole company and a statement of its assets, may order an investigation of its books, or require a general meeting of shareholders to be called.

Article 14. Should any transactions of the company or of its directors or auditors contravene the by-laws of the corporation or be prejudicial to the public interest, the Minister of Home Affairs may void them and require the resignation of the directors or auditors. He may also do the same should directors or auditors fail to carry out his directions.

Supplementary Rule

The above regulations shall be in force from the date of the promulgation of the "Law for the Encouragement of the Manufacture of Drugs and Dyes."

Should a stock subscription be opened before the promulgation of this law, a report must be rendered within two months in accordance with Article 2 of the preceding regulations.

DECLARES U. S. SHOULD PROFIT BY ENGLISH EXPERIENCE WITH GERMAN DYE TRUST

Over the signature of its vice-president, I. Nachsatz, the Atlantic Dyestuff Company, Burrage, Mass., recently sent a letter in response to an editorial in the Portsmouth "Times" dealing with the dispatch from the German Councillor at Rome to his Minister of Foreign Affairs in Berlin, which was recently printed in The Reporter. The letter calls the attention of the public to renewed German efforts to further their dye interests throughout the world by means of questionable trade methods, and asks that the experience of England be taken as a guide.

Both editorial and letter follow:

Copy of an Editorial Which Appeared in Portsmouth "Times" Thursday, January 5, 1922

"THE IMP AT WORK

"A New York trade paper publishes what is claimed to be a dispatch from the German Councillor at Rome to the German Minister of Foreign Affairs in Berlin, from which the following excerpts are taken:

"'In order that we may create for ourselves a favorable political situation, taking advantage of the malcontent of the Italian people, and especially the Nationalists and Nittian parties, against the Powers of the Entente, a political situation which might in due course be favorable to us when Germany should be faced by fresh complications, it is necessary to strengthen this discontent in order to consolidate our situation through economic action. . . . Inundating the Italian market with German goods we will not only have a place sympathetic to Germany, because, as many of our agents and commercial representatives have verified, Italian consumers gladly accept cheap articles, but we will also create a situation for Italian indutry which will render any continuation of activity impossible. This without doubt will cause such a crisis that, besides keeping Italy in constant agitation, will enable us to become the sole masters of the peninsular trade. . . . Further, such situation would enable us to purchase the Italian industries at a very low rate, which would be the key of the situation since it would also enable us to control trade between Italy and the Balkans in such a way that Italy would not compete with us for those markets. . . . Then we have the dyeing trade in Italy. . . . It is, however, necessary that in order to follow out in this branch the method of peaceful destruction advised by me, the Italian Government should not take precaution to prevent the import of coloring

matters from abroad, as otherwise it is certain that the Italian industries, which, it appears to me, are seeking American capital to support them, might assume a more solid position which it would be more difficult to destroy.'

"What a mischievous program, and what a warning to the United States."

Following is the reply of the company:

[*Letterhead of Atlantic Dyestuff Company*]

January 6, 1922.

"Editor, Portsmouth "Times,"

"Portsmouth, N. H.

'Dear Sir:

"Your editorial entitled 'The Imp at Work' in last evening's 'Times' emphasizes the German modus operandi for the future. Too much publicity cannot be given this article. It typifies the well thought out plans of armament of the militaristic element and the same inseparable spirit pervading the German people.

"Too little is known by the layman of the close relationship existing between the manufacture of organic coloring matters and explosives. The fact is that the two are indivisible, and cannot be thought of separately. You are actually manufacturing explosives when you manufacture intermediates for dyestuffs. The subject is entirely too lengthy to go into detail at this time, but suffice it to say that the average dyestuff plant can convert its operation in twenty-four hours to the manufacture of explosives. Should any desire proof to substantiate this claim, the same can be obtained with little difficulty, for the asking

"Some may think this not in full accord with the present craving throughout the world for peace as is evidenced by the present Disarmament Conference, but it must be admitted that Germany's dyestuff industry has and will not be in any way impaired.

"This automatically places Germany from the chemical and, therefore, the most important standpoint, always prepared for the most effective warfare.

"With a knowledge of this fact one can readily appreciate the thought in the mind of the 'Minister of Foreign Affairs in Berlin' as expressed by the desire to get control of the Italian dyestuff industry. The same agents are now at work at the capitals of all countries formerly dependent on the German chemical industry, spreading propaganda to bring about 'a crisis that, besides keeping them (Italy) in constant agitation, will enable us to become sole masters of the peninsular trade.' These same sinister forces have been and still are at work at Washington, pursuing either foul or fair means to bring about the elimination of the present existing licensing feature in our Emergency Tariff Bill, which, although even only partially effective—because of the many loopholes still existing—renders complete destruction of the dyestuff industry at least difficult. As a result of this effective propaganda, we find that many of our legislators have succumbed to their reasoning and even question the advisability of the retention of the licensing feature.

"If we are to retain the full benefits of a large basic—and from a common-sense standpoint of protection—a vitally important industry, we must provide some means for its preservation. We can do no better than to profit by the experience of England where a dyestuff licensing plan has proven to be the only effective means of handling the situation.

"Your closing paragraph, 'What a mischievous program, and what a warning to the United States,' should be impressed indelibly upon the minds of our legislators for our own future protection.

"Yours very truly,

"Atlantic Dyestuff Company,

"J. Nachsatz, Vice-President."

PROPACH TO ESTABLISH DYE AND CHEMICAL BUSINESS ON PACIFIC COAST

C. Propach has announced his intention of locating in California, either in San Francisco or Los Angeles, and establishing there a business in dyestuffs, chemicals and allied products. Having covered this territory for the past twenty-five years in the interests of the Bayer Company, pre-war, Grasselli, and lately of the Geigy Company, Inc., he is thoroughly conversant with the requirements of the trade in detail, and expects to continue and increase the volume of business in these lines. Mr. Propach served in the capacity of manager of the Geigy Company's Chicago office, 2340 Commonwealth Avenue, that city, which is his forwarding address until his Pacific Coast location shall have been selected.

CAMPBELL ANNOUNCES IMPORTANT REVISION OF PRICES ON FAST WOOL BLUES

In preparation for the expected demand for blues for both women's and men's wear, John Campbell & Co., 75 Hudson Street, New York, announce themselves in a position to furnish a selected range of Fast Wool Blues for all classes of dyeing. The company is manufacturing and featuring especially Aceko Fast Blue 2R and Aceko Cyanine 5R Extra. These colors are also known to the trade under the following designations: Coomassie Navy Blue, Buffalo Cyanone, Sulphon Cyanine, Buffalo Fast Blue, and Sulphon Acid Blue.

The Aceko Cyanines and Aceko Fast Blues, as manufactured by the company, are said to equal in shade, properties and fastness, to any of the competitive domestic or imported standards. Both of these series of colors are now offered at low prices, which will show a 50 per cent decrease since last spring.

Aceko Fast Blue and Aceko Cyanines are suitable for straight acid dyeing, chromate and top chrome methods of application Aceko Cyanines are also neutral dyeing and find a useful application for shoddies. Aceko cyanines are fast to light and wear. Aceko Fast Blue 2R is a straight Acid Blue of splendid brilliancy and fullness of shade. Dyeings made with this color are characterized by their beauty of shade and light fastness.

Full particulars, product samples and prices will be furnished upon request to the company or any of its branches.

PERKIN MEDAL FOR 1921 AWARDED TO DR. W. M. BURTON

The inventor of the cracking process which permits the use of 2,000,000 more motor vehicles than could otherwise be supplied with gasoline from the given consumption of crude petroleum, was last week awarded the highest honor of the Society of Industrial Chemistry of Great Britain.

This award, the Perkin Medal, was presented to Dr. William M. Burton of the Standard Oil Company of Indiana before a distinguished gathering of scientists at the Chemists' Club of New York. The Perkin Medal is reserved for the man who has made the most valuable contribution to the chemical industry each year. In 1918 Dr. Burton was awarded the Willard Gibbs medal by the Chicago Section of the American Chemical Society.

In the Standard Oil laboratories at Whiting, Ind., Dr. Burton directed the experimental and practical work which has resulted in doubling the yield of gasoline from crude petroleum.

In his speech of acceptance Dr. Burton recounted some of his experiences. Practical men in the oil industry, he said, declined to help operate a still containing 6,000 gallons of oil under pressure, flaming all over its surface and, despite its tight steel construction, leaking around the seams and rivets.

Inasmuch as steel begins to give way at a temperature of 450 deg. Cent., and inasmuch as the cracking process requires operation with temperatures at 370 to 400 deg. the disinclination of the practical workers to be anywhere in the vicinity of the still is not beyond understanding.

"Despite the narrow margin of safety," said Dr. Burton, "more than 800 such stills were put into operation before we had a single fatal accident." Other companies, under license, are now operating as many more such stills and the production of "cracked" gasoline is about 2,000,000 gallons daily. This is about one-sixth of the total produced in the United States and Canada.

The Burton process also conserves for future consumption an amount of crude oil equal to 100,000,000 barrels per year.

Russell Wiles, patent attorney for the Standard Oil Company, asserted that the work of Dr. Burton may well be regarded as an early example of the great things the chemist is to accomplish in the future, and that the "epoch-making inventions of the future probably will be those of the chemist and phyisicist. New developments in steam, electricity and in the automotive field are to-day generally predictable.

"The day of the chemist is here," he declared. "You hold the future of industry."

The Perkin Medal was awarded by the American Section of the British Society, through Allen Rogers, of Pratt Institute.

John M. Queeny, president of the Monsanto Chemical Works, has completed an extended business trip abroad and is back at his desk in the St. Louis office of the company.

NOTES OF THE TRADE

Under the laws of New Jersey the Clifton Textile Company has been incorporated to buy, sell, manufacture, work, prepare, treat and in all ways handle and deal in silk, wool and other textile fabrics of all kinds, and the materials which enter into the composition of such products, and to bleach and dye and to operate as manufacturers of bleaching and dyeing materials, etc. The capital of the firm is $125,000, and headquarters will be located at Clifton, N. J.

The Haberland Manufacturing Company has been incorporated under the laws of New Jersey with a capital of $1,200,000 to manufacture, refine, adapt and prepare chemicals, dyes, cotton and woolen fabrics and any and every product thereof. Headquarters will be in Jersey City.

A loss of $100,000 was sustained December 25 when the Paul Ulrich Dye Company's plant at 33 Herkimer Place, Brooklyn, was burned, including adjoining buildings. The plant of the Brooklyn Fur Dressing & Dyeing Company was threatened, but suffered minor loss only through damage by water.

Dyestuffs for December contains an article on "Dyes Wearing Apparel," by Louis J. Matos, Ph.D.; "Printing and Dyeing in the Bombay Bazaar," by Henry R. Band; illustrations of the National Aniline Company's exhibit at the International Textile Exposition, and many other features.

Arthur A. Lehman, formerly manager of the Cheemical and Textile Department of S. Wander & Sons Chemical Company has resigned his position and started his own business. Mr. Lehman will operate in the capacity of dealer and agent in chemicals, oils and dyewood extracts.

The Chemical Sales Company, Detroit, Mich., has completed organization and opened offices in the Detroit Savings Bank Building, rooms 1027-1029. It will operate as general drug and chemical brokers, handling drugs, essential oils, dyestuffs, fine chemicals and medicinals.

The Atlantic Chemical Company, with plant at Irvington N. J., for the manufacture of lacquers, made a plea on December 21, before Vice-Chancellor Foster, of Newark, for a restraining order against the Atlantic Chemical Works, Ltd., of Elizabeth, N. J., manufacturer of dyes and coal-tar distillates, to compel the Elizabeth company to change its name, owing to the confusion in mail and telephone orders. The Irvington company was established in December, 1918, and the Elizabeth company in January, 1921. The Vice-Chancellor assented to an agreement made by both sides to the controversy that the Atlantic Chemical Works, Lt., of Elizabeth, should change its name within six months.

CHINESE COLOR PREJUDICES

The Chinese, as is well known, have decided ideas of their own as to the use of colors in materials, wrappings and poster advertising, says the "Dyer & Calico Printer." Prejudices have been known to cause a Chinese customer to change his patronage merely because of the coloring of packing paper used. Though no definite rule can be applied to all commercial uses of color, it can be said generally that gold, yellow, red, bright brown, purple and certain shades of pink are good colors. Gold is a dignified color, red the color of good fortune. Imperial yellow is good for rugs, carpets and curtains. White and blue are mourning, and should be avoided, as well as green, which is associated with misfortune. The designing of posters and advertising matter should always be handled by agencies in China who are familiar with the tastes and prejudices of the communities involved.

Walter Ekstrand has become Overseer of Dyeing for the Olney Woolen Mills, Cherry Valley, Mass.

With a capital of $20,000, the Imperial Cleaning & Dyeing Corporation has been incorporated under the laws of Massachusetts. The headquarters of the new enterprise is located in Worcester.

Review of Recent Literature

Coke Oven and By-product Works Chemistry. Thomas Biddulph-Smith. Cloth; 196 pages; 62 illustrations and 7 folding plates; $7.00. J. B. Lippincott Company.

It has been remarked that beyond textbooks written for the gas industry, no texts are obtainable for the guidance of the coke-oven and by-products works chemists. The various works on chemistry applying to gas manufacture, although extremely useful, do not by a long way meet the requirements. The author of the present work has therefore endeavored to furnish the coke-oven and by-products works manager and chemist with a concise manual covering, as far as space will allow, the general work required for the chemical control of such plants. *Contents.*—Washery and Oven. Gas. Analysis of the Gas. Flue Gases. Tar Distillation Plant. Testing of the Fractions on Tar Distillation. Estimation of "Free Carbon" in Tar and Pitch. Ammonia Sulphate Plant. Calorimetry and Pyrometry. Benzol Recovery Plant. Analysis of Crude Benzol. Commercial Benzols. The Analysis of Commercial Benzols. The Estimation of Xylene in Solvent Naphtha; Estimation of Thiophene. Estimation of Carbon Disulphite. Appendix I.—*Some Constituents of Coal Tar and Their Properties.* Appendix II.—*International Atomic Weights* (1918). Standard Solutions for Volumetric Analysis; Indicators. Factors for Correcting the Volume of Decinormal Solutions to 15 deg. Cent. Tables for Use in Volumetric Analysis; Table of Conversion Factors. Mensuration of Surfaces and Solids. Freezing Mixtures. Melting Points. Linear Expansion of Substances. Reduction of Water Pressure to Mercurial Pressure. Specific Gravity and Percentage of Saturated Solutions. Index.

The Carbonizing Process. J. Dumville and S. Kershaw. Bradford, "The Wool Record and Textile World." 5s. net.

This is an essentially practical and useful treatise on the practice of carbonizing wool for the removal of vegetable impurities. The early part of the book deals in comprehensive manner with the origin and characteristics of the most important vegetable impurities which become entangled in wool. Recognizing that the process of burr carbonizing rests on a chemical basis, the authors fully explain the methods of carbonizing with sulphuric acid and also with other agents. The cleansing of the wool prior to carbonizing is next dealt with, and is followed by a description of modern types of wool-washing machines, with brief mention of a machine used for recovering fiber from wash liquors. Carbonizing proper comprises five processes, viz.: (1) Steeping in acid; (2) extraction of superfluous acid; (3) drying and baking of acidified wool; (4) burr crushing and shaking to remove the carbonized vegetable impurities; and (5) rinsing and neutralizing the acidified wool in weak alkaline solution. These processes are described in sequence, with illustrations and explanations of the machines and plant used. The book is well written, and should be greatly welcomed by those engaged in the wool-carbonizing industry.

Glossary of Textile Terms. H. B. Custis; Manchester, England.

The number of terms related to the textile industry is so large and is constantly increasing to such an extent that a comprehensive glossary is almost an essential to anyone who wishes to keep abreast of the times. It is almost a physical impossibility for one book to contain every known term to date. Further difficulty is encountered in the growth of new terms from time to time. For that reason the glossary mentioned above is of particular interest in that its alternate pages are blank, permitting the owner of the book to make additions of new terms as he encounters them.

The book has been compiled with a view to placing in a convenient form for reference the common terms used in the cotton trade, and particularly in Manchester. Nevertheless it is of interest to those concerned in the industry throughout the world. The descriptions are given in simple language so that technical knowledge is not an

absolute prerequisite for the reader. The compilation is based on careful notes made by the author during the last twenty years.

Cotton Spinning. A. S. Wade. London, Sir Isaac Pitman & Sons, Ltd. 3s. net.

This is another of "Pitman's Common Commodities and Industries" series. It comprises 102 pages of a general narrative of cotton spinning as a large, world-important business. It does not deal with the technical operations of cotton spinning, however. The scope of the work is aptly indicated by the titles of the chapters, viz.: The World's Spindles; Cotton Spinning After the War; Cotton-Spinning-Mill Finance; Collective Bargaining; The Raw-Cotton Position; Early Spinning Inventions, and The Modern Spinning Mill. The book is full of interest. It deals with those larger aspects of the governance and organization of the cotton-spinning industry that are little known to people in general. Throughout the book one finds important statistics of the trade which clearly indicate the size and intricacy of the cotton-spinning industry. On page 94, in remarking on extraordinarily fine yarns, the author says that "up to 10,000's has once been spun, a pound of which would reach 4,776 miles."

Bleaching. S. H. Higgins; London, England.

The title of this book is rather misleading, since the author does not attempt to give an account of the subject of bleaching but rather to discuss the important researches bearing on the bleaching industry published during the period 1908-20, and to present a record of the work as a basis for the extension of research in the industry. The latter is the real purpose of the book, and Mr. Higgins has accomplished it well by approaching the subject from a scientific standpoint and by supplementing empiricism with as much scientific knowledge as is available on this vague subject.

The author, who is head of the Research Department of the Bleachers' Association, Ltd., states that his book is not meant for those who have no other books on bleaching, but rather as a supplement to other published works. The title of the work, he says, might be more accurately given as "Cellulose: Bleaching."

The headings of certain of the chapters may give an idea of the many phases of the subject which Mr. Higgins has treated and on which he quotes other authors: Elimination of the Non-Cellulose Constituents in the Bleaching Process: Elimination of the Waxes; Elimination of the Proteins; Elimination of the Mineral and Pectic Matters; Destruction of the Coloring Matter by Oxidizing Agents: Hypochlorites Produced by Electrolysis; Cellulose and Water; Cellulose and Oxidizing Agents; Cellulose—the Bleached Product; Bleaching Processes; Bleaching Faults.

The book should prove to be a valuable contribution to the literature on bleaching.

INQUIRY DEPARTMENT

All classes of chemical work or advice relating to artificial colors, natural dyestuffs, dyewoods, raw materials, extracts, intermediates, crudes, or dyeing chemicals and accessories in general, will be carried out for readers and subscribers of the AMERICAN DYESTUFF REPORTER by this department.

Inquiries of a minor character will be answered on this page, while major matters involving personal investigation, analyses, perfected processes and working formulas, will, if desired, be treated confidentially through the mails. In answering inquiries which, by their nature, require reference to the products, processes or apparatus of some particular manufacturer we aim to be absolutely impartial. We refer the inquiries to specialists whom we believe to be best qualified to answer them intelligently, and must disclaim responsibility if their reports show unintentional bias. All questions, materials for analysis or letters leading to the opening of negotiations for special work will receive prompt attention if addressed to Inquiry Department, American Dyestuff Reporter, Woolworth Building, New York City.

J. M. W.—*Question:* Is it possible to obtain dyes that will simply impart a light tint to silk and cotton, say, from a weak soap bath, but which can be entirely washed out by hot water?

Answer: There are many dyes of this sort. In fact, many firms are selling dyes for this purpose to silk throwsters who have to tint the various lots of silk they handle so as to distinguish lots, certain twists and qualities, and avoid confusion. The same dyes are sold for domestic use (much weaker, however), so that it is possible for a woman to buy a white blouse and then tint it a different shade every time it is washed. In tinting, the dye does not actually dye the fiber, as in true dyeing, but there is a slight affinity for the color, which may be applied evenly, and even rinsed in cold water; but the affinity of the dye is so slight that a little soap and hot water strips it entirely. We cannot, in fairness to our advertisers, give you a list of the dyes you might use, but refer you to them for further details.

M. C.—*Question:* In boiling off half-silk hosiery I find that I cannot get rid of all the oil, gum and tint in one soap boil, but do not want to increase my expense for soap, as I am using 25 per cent now. Do you advise the use of soda or even stronger alkali, or would it hurt the goods?

Answer: You are using enough soap, providing you are not boiling off in too short a liquor; but to improve matters and not increase your soap bill, without using soda, which is not advisable, you need only save an old soap bath and run the goods twenty minutes in it to remove most of the oil, gum and tint. Then run in a fresh bath twenty minutes and the stockings will be ready to dye. Save this second liquor for the first bath of the next lot and you will improve your work without increasing your amount of soap.

V. C.—*Question:* What class of dyestuffs are best suited for the production of fancy shades on wool to stand fulling?

Answer: The answer obviously is the mordant dyes

fixed by chrome; but the question then arises, What process? There are a few azo dyes and the derivatives of Gallocyanine, which give fast dyeings on a chrome mordant; but dyers object to this process for several reasons, viz.: the time required, the lack of complete penetration, the effect of long working and boiling on the wool, and the harshness often obtained. The next method is by after-chroming or top-chroming certain acid dyestuffs. This method gives a greater variety of brilliant shades and allows the admixture of acid dyes like Wool Green S, Patent Blue A, Acid Violet and others which, while not properly mordant dyes, are made fast by the operation. The objections to this process are that many dyes, especially those containing chromotropic acid, are greatly changed in shade by the chroming, and make the matching of shades difficult; also, that there is always some free chromic acid left on the dyed fiber, and this may cause changes in shade during steaming and other finishing processes, or may alter adjacent colors in the finished fabric.

The third method is the monochrome or chromate or any other single-bath chrome process where free bichromate is added together with the dye, and where acid is added either by the dyer or set free by the decomposition of an ammonium salt during the boiling.

The one-bath process is best suited for the lighter shades and for pieces with silk effects. It has the advantage of making the matching of shades a more simple matter, and is adapted for use in special types of dyeing machines for slubbing, jackspools, etc. Some claim that the one-bath process gives shades faster to fulling than after-chroming, but our personal opinion is that the one-bath method should be used for the lighter shades and the after-chrome process for heavy shades.

On this subject, as with all other practical dyeing questions, you will find advocates of each process who are equally positive that their way is the only one to be considered.

E. F. S.—*Question:* Have basic dyes any practical use in the dyeing of wool?

Answer: There are quite a number of mills, particularly those making fancy blankets, that dye loose wool with such dyes as Methylene Blue, Victoria Blue, Methyl Violet, Rhodamine Fuchsine, Safranine and Chrysoidine. The reason is because the dyes are brilliant, very strong, stand light fulling and particularly sulphur bleach. Occasionally we see plaid cloakings with the reverse side in blue, purple or some other solid shade. In this case there is no exposure to light and the basic dyes have been found adequate. However, we feel that, except for goods that are not to be subjected to any amount of wear or exposure, good wool is at least worthy of good dyes. So long as the manufacturer of the fabrics continues the use of any class of dyes he, of course, creates a demand which will naturally be supplied by the dealer, but it is just this sort of dyeing which has given the opponents of American dyestuffs a good opportunity to criticise.

Recent Patents

Knitting Machine Construction

(1,398,865; November 29, 1921)

Walter Larkin (assignor to Fidelity Machine & Manufacturing Company, Philadelphia, Pa.)

Claim is made for the combination in a circular knitting machine of a main supporting frame; a needle cylinder; an adapter ring removably connecting the frame and the cylinder; and a cam ring rotatably mounted on the adapter ring.

Stop Motion for Knitting Machines

(1,398,694; November 29, 1921)

Edson S. Hineline (assignor to Hineline Engineering Company, Providence, R. I.)

Patentee describes the combination with the needles of a knitting machine adapted for both rotary and reciprocating knitting, and a member mounted to slide toward and from the needles, and having functioning relation with respect to the normal path of the needles during rotary knitting, whereby it may cause functioning of an emergency device, but having non-functioning relation with respect thereto during reciprocating knitting.

Machine for Treating Cotton

(1,394,775; October 25, 1921)

James Franklin Levering (assignor to Standard Cotton Company of America, Delaware)

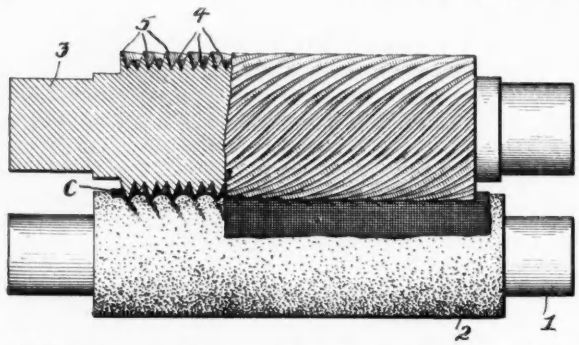
This is a machine for treating cotton comprising in combination a supporting frame and movable devices supported thereby adapted to operate upon the cotton, comprising agitators adapted to break the hull of the cotton boll and transfer the same onward into the apparatus, a rotating drum provided with fingers adapted to receive same and carry same onward, a knife adapted to scrape the fragments of hull and trash from the cotton as the same is carried onward by said rotating drum, rotating fingers adapted to take up said trash, a traveling apron adapted to receive said trash and convey the same out of the apparatus, a doffer brush adapted to remove said cotton from said rotating drum, a second knife adapted to remove from said rotating drum any trash which may not have been removed by said first-named knife, means adapted to convey said cotton out of the apparatus, and means adapted to operate said movable parts.

Cloth Finishing

(1,401,663; December 27, 1921)

Gustav Wolf

Claim is made, in a cloth-finishing device, for a lower roll having a felt covering, and an upper roll having



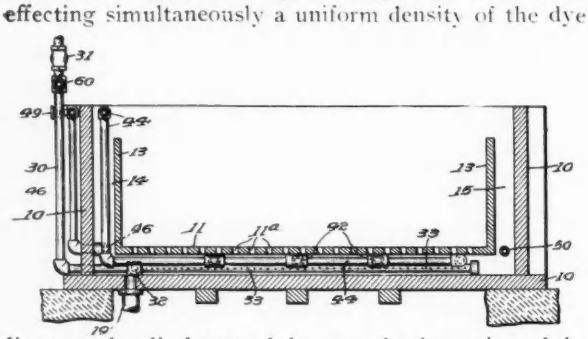
metallic teeth of spiral form and arranged to be of alternating depths, whereby to provide a three-point contact with the cloth.

Process of Dyeing Yarns and the Like

(1,400,675; December 20, 1921)

James A. Grundy (assignor to John Bromley & Sons, Inc., Philadelphia, Pa.)

The process of dyeing yarns and the like which consists in supporting them in a suitable container of dyeing liquor which has been previously heated to a temperature of approximately 212 deg. Fahr., and then effecting simultaneously a uniform density of the dye



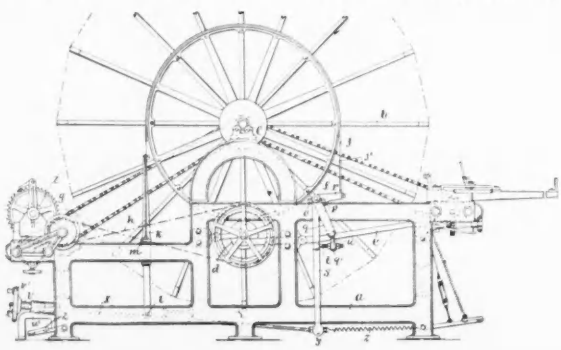
liquor and a discharge of the same in the region of the suspended yarns, by utilization of the expansive and propulsive forces of compressed air at a minimum pressure of approximately 20 pounds to the square inch above normal or atmospheric pressure, delivered within the body of dye liquor by means of suitably arranged piping.

Warping and Beaming Machine

(1,401,655; December 27, 1921)

Grant Sipp

In a machine of the class described having a rotary



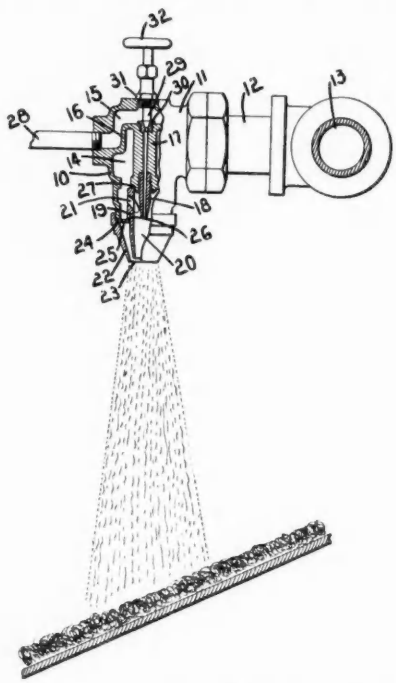
member whose rotation is to be resisted, the combination of a supporting structure and mechanism therein to resist rotation of said member, including a brake device to frictionally contact with said member and means to resist movement of said device with said member due to friction between them, including a flexible elastic lever structure; said supporting structure having means to support said member with its axis parallel with the fulcrum of said lever structure.

Fiber Conditioning Process and Apparatus

(1,401,376; December 27, 1921)

Albert W. Thompson (assignor, by mesne assignments, to Parks-Cramer Company, Boston, Mass.

Patentee describes the process of moistening textile fibers which consists in forcibly projecting globules of a moistening liquid into a moving mass of textile fibers by means of a whirling jet of gaseous fluid, said jet being surrounded by an envelop of gaseous fluid



also projected under pressure whereby the envelop of gaseous fluid will agitate said fibers and will concentrate the fluid carrying jet and cause the same to penetrate deeply into the mass, the quantity of fluid and the quality of globules being correlated to the character of the material treated.

Preparation of Knitted Fabrics for Use

(1,401,501; December 27, 1921)

Charles E. Shaw

Recites a method of preparing tubular knitted fabrics for handling comprising reinforcing a longitudinal zone thereof by means positioning the threads in the zone against relative movement and longitudinally slitting the fabric along said zone.

Hand-Wheel Mechanism for Looms and Other Machines

(1,401,098; December 20, 1921)

Alonzo E. Rhoades (assignor to Draper Corporation, Hopedale, Mass.)

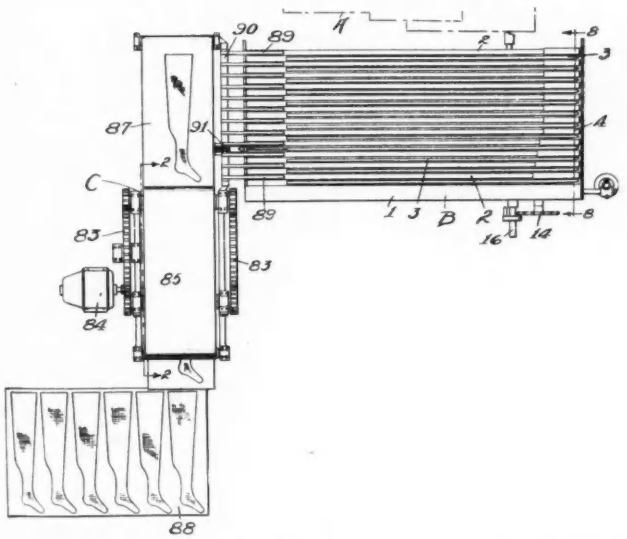
Patentee describes, in a machine having a driving shaft, power supplying means, a clutch for transmitting power therefrom to said driving shaft having means normally tending to disengage said clutch and means for shifting said clutch into operative position, a hand wheel, means operable by said hand wheel for rotating said driving shaft and means operable by the shifting of said clutch to operative position to render and maintain said hand wheel inoperative during the actuation of the driving shaft by the power-supplying means.

Feeding Mechanism for Hosiery Presses

(1,400,645; December 20, 1921)

Charles E. Waream (assignor to American Laundry Machinery Company, Norwood, Ohio)

This consists of apparatus of the class described, comprising a pressing machine, a feeding table, means for advancing stockings step by step along said table



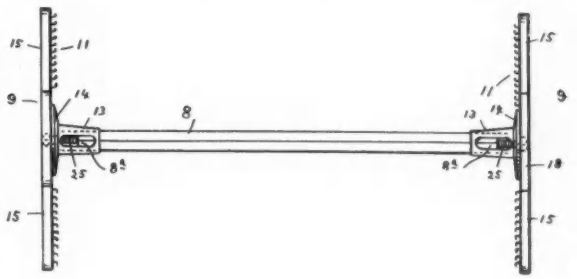
in the direction of its length, and means associated therewith for removing the stockings from the table and delivering them in a direction transverse to the length of said table to the pressing machine.

Pile Fabric Frame

(1,400,529; December 20, 1921)

Percival W. Copeland (assignor to Hind & Harrison Plush Company, Clark Mills, N. Y.)

In a frame for storing and transporting pile fabric the combination of a shaft having angular-shaped ends, two end members each comprising a hub portion, an inwardly extending socket slidingly and removably fitting over the ends of said shaft and hook-supporting arms radiating from the hub portion, a set-screw threaded through the hub portion of each end member with its inner end engaging the end of the shaft with-



in the socket whereby the end members are adjustably, non-rotatably and removably secured to the shaft.

Halogenation of Anthraquinone Derivatives

(1,401,125; December 27, 1921)

Frederick William Atack and George Robertson

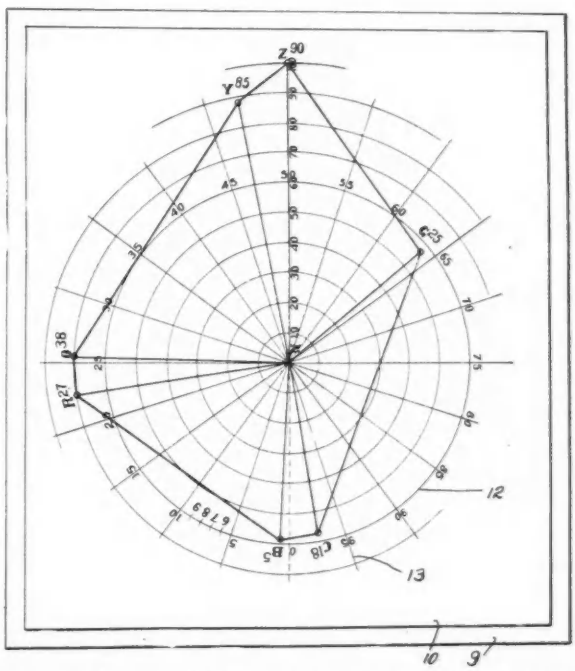
Patentees describe the process of halogenating anthraquinone derivatives in a hot aromatic liquid in the presence of a neutralizing agent.

Compounding Colors, and Apparatus for Same

(1,400,552; December 20, 1921)

Arthur Howland

Various claims describe respectively: An article,



representing qualitative relations of colors to each other, comprising a structure and spots thereon repre-

senting color; those of said spots whose colors differ in luminosity being arranged at directions and distances from each other which when projected upon a scale of luminosity are directly proportional to the differences in quantity of ingredient white in the grays respectively equaling them in luminosity.

The art of color synthesis from a plurality of ingredients differing in hue from the color which is to be made, comprising the associating and spinning of said ingredients together, with a space left between them wherein is a vista from which approximately no light reaches the eye, whereby ingredients having a higher luminosity and diverse hue may be used in a desired synthetic color of lower luminosity.

A multicolor iconograph comprising a body having a surface with spots representing different hues arranged around a neutral axis at angular distances apart according to the differences of valve length of their respective hues.

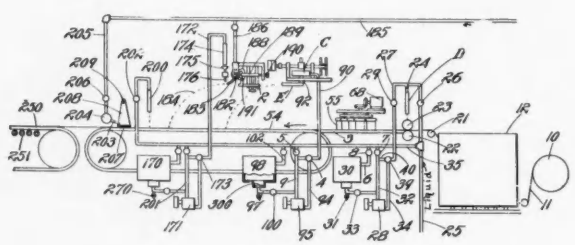
Apparatus to determine the synthetic proportions of three or more working colors to be mixed to make a desired color; said working colors being of differing luminosity, of great strength, and of hues widely separated from each other; comprising in combination said working colors and a chart having fixed upon it spots indicating by their respective positions the hues and strengths and indicia associated therewith indicating the luminosities of said working colors relative to each other according to scales of color qualities; whereby ingredients of any required one of a multiplicity of other colors are computable from the chart by measure and by application of mathematical laws, and said required color is producible from said working colors by mixing them or some of them together as ingredients in proportions thus computed.

Coloring Machine

(1,401,504; December 27, 1921)

Rudolph Sykora

Various claims describe respectively: An apparatus for applying liquid coloring matter to a web of sheet material, having means for applying liquid to the surface of the web, and having a series of brushes which



move in sequence transversely over the surface of the web from one side of the web to the other and back, and means for moving each brush in such manner that it moves entirely off the web at each side before it begins its return movement.

An apparatus for applying liquid to the surface of a web of sheet material, having a traveling carrier which supports and carries the web, means for applying liquid to the web, mechanism which clamps the web to the carrier on which it is supported and carried, said clamping mechanism being movable with the carrier and being laterally extensible, the extensibility being controlled by the expansion and contraction of the web.

Means for distributing liquid upon sheet material comprising a drum having a diaphragm top, a liquid supply pipe leading into the drum, an outlet pipe, and means for automatically delivering a continued series of blows upon the diaphragm.

A machine for producing water-color surface on sheet material having a series of funnels, means for discharging liquid into the funnels, and a mount for each of said funnels comprising a pair of parallel rods having a series of curved recesses therein, the recesses in one of said rods co-operating with the recesses in the other rod to form a series of spherical pockets, a ball mounted in each of said pockets, and means for clamping each of said rods together so as to hold said balls in the pockets, each of said balls being formed with a perforation through which the stem of one of said funnels extends, said funnels being adjustable to varying angles by loosening the bolts, turning the balls and again setting up the bolts.

A machine for producing water-color surface on sheet material, having means for depositing liquid upon the surface of the sheet, an air blast, and a deflector by which the air blast is deflected to spread the depositing liquid on the sheet.

Manufacture of Paranitroaniline from Paranitroacetanilid

(1,400,555; December 27, 1921)

Kaichi Kasai (assignor to Mitsui Mining Company, Tokyo, Japan)

Patentee describes the process of manufacturing paranitraniline characterized by subjecting to pressure a mixture of paranitracetanilid and an aqueous alkaline solution, while heating the said mixture to a temperature between 120 and 130 deg. Cent., substantially as described.

Salvage Trimmer for Looms

(1,400,711; December 20, 1921)

Harry T. Abbott (assignor to Draper Corporation, Hopedale, Mass.)

This comprises a loom comprising a frame, cutting mechanism supported from the frame with its field of action beneath the selvage of the cloth and forward of the fell and operating in a plane at an angle to the vertical and means for operating said cutting mechanism from a moving part of the loom whereby filling ends depending from the selvage are severed.